MECHANIX ILLUSTRATED

FEBRUARY

MORE PAGES ONLY 20c

PILOT'S STRATOSPHERE SUIT

I FULL COLOR—PAINTINGS THAT REVEAL INSANITY

BUILD A RANCH-STYLE HOME FROM MUD SEE PAGE 114

IDEAL FOR Auto-Home Appliance & Farm REPAIRS

Now A DYNAMIC HEAVY DUTY INDUSTRIAL WELDER

Available Now—Immediate Deliveries

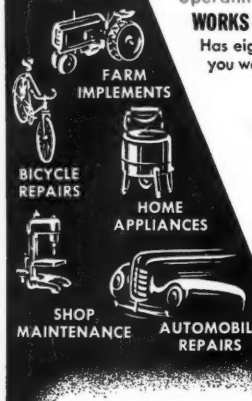
FOR ONLY $23.50 COMPLETE

Designed to Do High-Grade Welding *Inexpensively*

Maintenance men, farmers, mechanics, machine shops, foundries, auto, general repair and job welding shops using the DYNAMIC WELDER find it so indispensable and useful that they cannot afford to be without it. If inexperienced you can easily learn to do a variety of high-grade welding jobs by following the practical, simplified operating and welding instructions furnished.

WORKS ON IRON, STEEL, BRASS, BRONZE and OTHER METALS

Has eight metallic and carbon arc welding heat stages. Does work you would think only possible with a larger, more expensive machine.



READ WHAT USERS SAY...

Repair Shop Owner says, "It will do more than you say"

"I want to say I operate a repair garage and am more than satisfied with the welder. It will do more than you say." C. P., Butler, Ohio

It's the Greatest Portable Outfit

"Now I am equipped for all kinds of welding and I must say it's the greatest portable outfit for welding any man could ever wish to own. I wouldn't sell mine for the cost of plenty welders I have seen which were very high in cost but not in convenience. You may put me on file as a booster of your wonderful welding product." W. J. B., St. John, N. B., Canada

Better Than I Expected

"I have done quite a little welding with my welder and will say it is better than I expected. The price, convenience, and variety of work that can be done with the Dynamic are the attractive points." W. R. P., Portland, Ore.

AMAZINGLY SIMPLE TO OPERATE!

This portable Dynamic Welder, easily carried right to the job, can be operated from any convenient properly wired 110 Volt 60 cycle line. Can also be supplied for 220 Volt 60 cycle operation and for other voltages and cycles at slight additional cost.

EASY TO OPERATE!

DYNAMIC SUPERCHARGED WELDER

Once you see a DYNAMIC in operation you won't want to be without it. Its simplicity will amaze you. In a year the DYNAMIC only costs you about 6c a day. COMES COMPLETE, READY TO OPERATE, WITH HELMET, RODS, CABLES, ELECTRODE HOLDER AND OPERATING INSTRUCTIONS, ETC. NOTHING ELSE TO BUY. Write today for Free particulars. Act now and get details on our amazingly low-priced Dynamic Welder and 10-day trial offer. **DYNAMIC WELDER CO.,**

13 East 23rd Street HR, Chicago 16, Ill.

MAIL COUPON FOR FREE DETAILS

10-DAY TRIAL OFFER

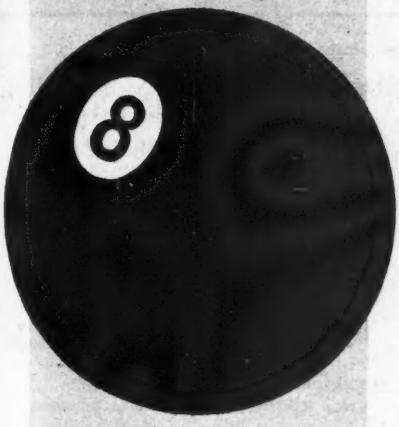
DYNAMIC WELDER CO.
13 East 23rd Street HR, CHICAGO 16, ILL.
Send me free details of your 10-DAY trial offer.

Name .....

Address .....

City..... Zone..... State.....

NOT BACK HERE!



I. C. S. graduates turn up in lots of places — but not "behind the 8-ball." You'll find thousands of them in *top* executive posts . . . hundreds of thousands holding good positions and regularly collecting promotions and pay raises.

They realized that the advancements go to the trained men . . . and that practical, authoritative I.C.S. training is just as close to any one as the nearest letter-box. Many of them started drawing the dividends of larger pay checks and increased responsibilities *before* they completed their I.C.S. Courses.

The road they followed to success is open to you. I.C.S. Courses cover more than 400 business and technical subjects. You study in your spare time . . . at low cost . . . in a class by yourself.

If you're as smart as we think you are, you won't be caught "behind the 8-ball" with the untrained. You'll mail the coupon today for full information on how to join the trained men rewarded by this modern world.

INTERNATIONAL CORRESPONDENCE SCHOOLS

ICS

BOX 2324-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course *before* which I have marked X:

Air Conditioning and Plumbing Courses
- ☐ Air Conditioning
- ☐ Heating ☐ Plumbing
- ☐ Refrigeration ☐ Steam Fitting

Chemistry Courses
- ☐ Chemical Engineering
- ☐ Chemistry, Analytical
- ☐ Chemistry, Industrial
- ☐ Chemistry, Mfg. Iron & Steel
- ☐ Petroleum Refining ☐ Plastics
- ☐ Pulp and Paper Making

Civil Engineering, Architectural and Mining Courses
- ☐ Architectural Drafting
- ☐ Architecture
- ☐ Bridge and Building Foreman
- ☐ Building Estimating
- ☐ Civil Engineering
- ☐ Coal Mining
- ☐ Contracting and Building
- ☐ Highway Engineering
- ☐ Lumber Dealer
- ☐ Reading Structural Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Drafting
- ☐ Structural Engineering
- ☐ Surveying and Mapping

Communications Courses
- ☐ Electronics
- ☐ Practical Telephony
- ☐ Radio, General
- ☐ Radio Operating
- ☐ Radio Servicing
- ☐ Telegraph Engineering

Electrical Courses
- ☐ Electrical Drafting
- ☐ Electrical Engineering
- ☐ Electric Light and Power
- ☐ Lighting Technician
- ☐ Practical Electrician

Internal Combustion Engines Courses
- ☐ Auto Technician ☐ Aviation
- ☐ Diesel-Electric
- ☐ Diesel Engines ☐ Gas Engines

Mechanical Courses
- ☐ Aeronautical Engineering
- ☐ Aircraft Drafting
- ☐ Flight Engineer
- ☐ Foundry Work
- ☐ Heat Treatment of Metals
- ☐ Industrial Engineering
- ☐ Industrial Metallurgy
- ☐ Machine Shop
- ☐ Mechanical Drafting
- ☐ Mechanical Engineering
- ☐ Mold-Loft Work
- ☐ Patternmaking—Wood, Metal
- ☐ Reading Shop Blueprints
- ☐ Sheet-Metal Drafting
- ☐ Sheet-Metal Worker
- ☐ Ship Drafting ☐ Ship Fitting
- ☐ Tool Designing
- ☐ Toolmaking
- ☐ Welding—Gas and Electric

Railroad Courses
- ☐ Air Brake ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Locomotive Fireman
- ☐ Railroad Section Foreman

Steam Engineering Courses
- ☐ Boilermaking
- ☐ Combustion Engineering
- ☐ Engine Running
- ☐ Marine Engineering
- ☐ Steam Electric ☐ Steam Engines

Textile Courses
- ☐ Cotton Manufacturing
- ☐ Rayon Weaving
- ☐ Textile Designing
- ☐ Woolen Manufacturing

Business and Academic Courses
- ☐ Accounting ☐ Advertising
- ☐ Arithmetic ☐ Bookkeeping
- ☐ Business Correspondence
- ☐ Business Management
- ☐ Certified Public Accounting
- ☐ Commercial
- ☐ Cost Accounting
- ☐ Federal Tax
- ☐ First Year College
- ☐ Foremanship ☐ French
- ☐ Good English ☐ High School
- ☐ Higher Mathematics
- ☐ Illustrating ☐ Motor Traffic
- ☐ Postal Service
- ☐ Salesmanship ☐ Secretarial
- ☐ Sign Lettering
- ☐ Spanish ☐ Stenography
- ☐ Traffic Management

Name _____ *Age* _____ *Home Address* _____

City _____ *State* _____ *Present Position* _____

Working Hours _____ *A.M. to* _____ *P.M.* **Length of Service in World War II** _____

Special tuition rates to members of the Armed Forces. Enrollment under the G.I. Bill of Rights approved for War II Veterans.

Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

mechanix illustrated

Title Registered U. S. Patent Office

A Fawcett Publication

W. H. FAWCETT, Jr., President — ROGER FAWCETT, General Manager — RALPH DAIGH, Editorial Director

ROBERT HERTZBERG, Executive Editor

GILBERT PAUST, Feature Editor
LARRY EISINGER, Crafts & Hobbies Editor
ED RICHTSCHEIDT, Art Editor
JO McCALLION, In Charge of Production

Associate Editors: HARRY BATES, WAYNE AMOS, ROBERT BRIGHTMAN, WILLIAM E. DUGGAN

FEBRUARY, 1947 — VOL XXXVII, NO. 4

On the cover: Color photo of AAF substratosphere suit, by Rudy Arnold

SPECIAL FEATURES

Trapper a la Car
by Stanley de Treville 49
Grandpa never trapped like this

Confessions of a Hot Rod Jockey
by Earle Bruce 52
A champ gives the inside on amateur racing

Coast Guard Lays a Ghost
by James Nevin Miller 56
Icebergs must be watched—and controlled

Scientists Raid the Ocean Floor
by Joseph G. Cowley 59
There's a whole new world to be exploited

Design for Living—in Miniature
by Don Romero 63
You can see your house before you build it

You Can't Believe Your Ears! 66
How your radio sound-effects get that way

MI Tests the Jeep Station Wagon
by Tom McCahill 70
Straight dope on the mighty midget of peace

Night into Day
by John Adler 72
The ionosphere can be a colossal floodlight

Color Television Comes True
by Lester David 74
Better color is in the works

Lightplane by Rohr 77
You'd swear this plane flies backward

Stratosphere Weather Station 78
The data is automatically radioed back down

Your Plane Can Talk
by Ed Yulke 79
All the new lightplane radios are midgets

This Is the Supersonic Barrier
by Willy Ley 82
Amazing things happen at the speed of sound

Jeep Goes to Sea 86
Now it is true: the jeep can go anywhere

Science in Pictures 87

Paint with Your Fingers
by Gold V. Sanders 97
Secrets of your unconscious may be revealed

Daredevils on the Run
by Ed Kelly 102
Bobsledding is not for the timid

Eyeball Glasses 106
Contact lenses are now made of plastic

Color Contest 108
The winning contestants—and pictures

Editor's Workbench 12

Invention Clinic 20

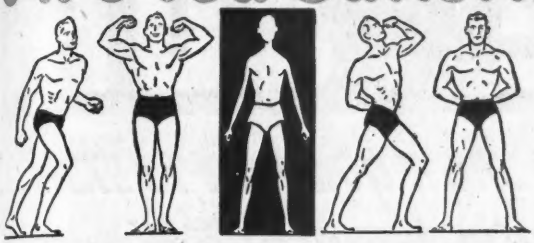
(Crafts and Hobbies, see page 6)

Copyright 1947 by Fawcett Publications, Inc.

MECHANIX ILLUSTRATED is published monthly by Fawcett Publications, Inc., 22 West Putnam Avenue, Greenwich, Conn. Printed in U. S. A. Advertising offices, 295 Madison Ave., N. Y. 17, N. Y. Editorial Offices, Paramount Building, 1501 Broadway, New York 18, N. Y. West Coast Representatives: Los Angeles, H. P. Houston, Edward S. Townsend Co., 645 S. Flower St.; San Francisco, Edward S. Townsend, Edward S. Townsend Co., Russ Building. General Offices, Fawcett Building, Greenwich, Conn. Elliott D. Odell, Advertising Director; Roscoe K. Fawcett, Circulation Director; Allen E. Norman, Secretary; Gordon Fawcett, Treasurer; Al Allard, Art Director. Entered as second-class matter at the post office at Greenwich, Conn., under the act of March 3, 1879. Additional entry at Louisville, Ky. Copyright 1947 by Fawcett Publications, Inc. Reprinting in whole or in part forbidden except by permission of the publishers. Title registered in the U. S. Patent Office. Address manuscripts to MECHANIX ILLUSTRATED, 347 Madison Ave., New York 17, N. Y. All remittances and correspondence concerning subscriptions as well as notification of change of address should be addressed to Circulation Department, 22 West Putnam Avenue, Greenwich, Conn. Not responsible for lost manuscripts or photos. Unacceptable contributions will be returned, if accompanied by sufficient first class postage. Price 20c per copy. Subscription price $2.40 per year in Canada, the United States and possessions. Foreign subscriptions $3.15 per year. Foreign subscriptions and sales should be remitted by International Money Order in United States funds, payable at Greenwich, Conn. Advertising forms close fifth of second month preceding date of issue.

MEMBER AUDIT BUREAU OF CIRCULATIONS

Are You Satisfied with YOUR BODY?



Let Me PROVE I Can Make You a NEW MAN in Only 15 Minutes a Day!

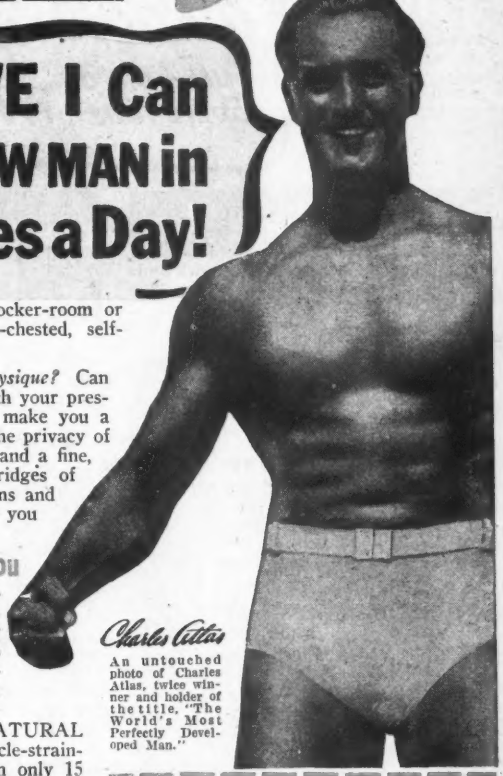
HOW do YOU look *stripped*—in locker-room or gym? Skinny, scrawny, sparrow-chested, self-conscious, HALF ALIVE?

How do you feel when people notice *your physique?* Can you stand their gaze? If you're not satisfied with your present physical development, let me prove I can make you a New Man—in only 15 minutes a day, right in the privacy of your own home! I'll give you biceps like iron and a fine, deep chest. I'll broaden your shoulders, add ridges of solid muscle to your stomach, fill out your arms and legs. If you are fat and flabby, I'll streamline you into a picture of radiant manhood.

What "Dynamic Tension" Can Do For You

"Dynamic Tension" changed me from a flat-chested 97-lb. weakling into the red-blooded HE-MAN that I am today. That's how I'm turning thousands of fellows LIKE YOURSELF into New Men—with husky, handsome body and tireless endurance. I can do the same for YOU! Let me PROVE it!

"Dynamic Tension" is a PRACTICAL and NATURAL method. You use no tiring apparatus, no muscle-straining gadgets. My method is actually FUN! In only 15 minutes a day, you will actually see your muscles increase into powerful bulges of brawn and strength. You'll enjoy new stamina, a glad-to-be-alive feeling. Before you know it, you'll have a rugged, handsome body, a rough-and-ready ambition surging out of you that the world can't lick! I'll show you how it really feels to LIVE!



Charles Atlas

An untouched photo of Charles Atlas, twice winner and holder of the title, "The World's Most Perfectly Developed Man."

SEND FOR FREE BOOK

All I ask is that you mail the coupon NOW for my illustrated FREE book, **"Everlasting Health and Strength."** It shows actual photos of pupils I've changed from weaklings into remarkable specimens of manhood. If you want a body that men respect and women admire, then get this coupon into the mails as fast as you can. Address me personally: **CHARLES ATLAS, Dept. 62, 115 E. 23rd St., New York 10, N. Y.**

CHARLES ATLAS, Dept. 62
115 East 23rd Street, New York 10, N. Y.

I want the proof that your system of *"Dynamic Tension"* will help make a New Man of me—give me a healthy, husky body and big muscle development. Send me your free book, "Everlasting Health and Strength."

NAME _____
(Please print or write plainly)

ADDRESS _____

CITY _____ Zone No. (if any) _____ STATE _____

☐ Check here if under 16 for Booklet A.

J. E. SMITH, President
National Radio Institute
The man who has directed the Home Study Training of more men for the Radio Industry than any other man in America.

BE YOUR

I will show you how to start a Radio Service Business

Full Time or Spare Time ***without capital***

I Trained These Men

$35 - $45 A Week In Own Shop

"Previous to enrolling for your Radio training I made $12 per week in a hardware store. Now I operate my own repair shop, and often clear $35 to $45 a week."—FREDERICK BELL, 76 Golf Ave., St. Johns, Newfoundland.

$250 A Month In Own Shop

"I am now operating a radio shop for myself and own all my equipment. Right now repairing radios pays me an average of about $250 a month."—J. M. SCRIVENER, JR., Aberdeen, Miss.

Averages Over $60 A Week

"Not long ago I was working 16 hours a day in a filling station at $10 a week. Now I have my own Radio business and average over $60 a week. The N. R. I. course is fine."—ALBERT C. CHRISTENSEN, 1116 Tenth Ave., Sidney, Neb.

$50 A Week From Own Shop

"Am making over $50 a week profit from my own shop. Have another N. R. I. graduate working for me. I like to hire N. R. I. men because they know Radio."—NORMAN MILLER, Hebron, Neb.

$50 A Month In Spare Time

"I have a spare time Radio and Electrical business of my own which has been very profitable, due to the efficient training I received from your Course. Last year I averaged over $50 a month."—FRED H. GRIFFIE, Rt. 3, Newville, Pa.

Fixing Radios Profitable Hobby

"I am doing Radio work in my spare time and find it a profitable hobby. My extra earnings run about $10 a week. I certainly am glad I took your N. R. I. Course."—FERDINAND ZIRBEL, Chaseley, N. Dak.

MY COURSE INCLUDES
TELEVISION
ELECTRONICS
FREQUENCY MODULATION

SAMPLE LESSON FREE

SEE OPPOSITE PAGE

APPROVED for training under G.I. BILL

Do you want a good-pay job in Radio—or your own money-making Radio Shop? Mail Coupon for a FREE Sample Lesson and my FREE 64-page book, "How to be a Success in RADIO—Television, Electronics." See how N. R. I. gives you practical Radio experience at home—building, testing, repairing Radios with BIG KITS OF PARTS I send!

Many Beginners Soon Make Good Extra Money in Spare Time While Learning

The day you enroll I start sending EXTRA MONEY JOB SHEETS. You LEARN Radio principles from my easy-to-grasp, illustrated lessons—PRACTICE what you learn with parts I send—USE your knowledge to make EXTRA money fixing neighbors' Radios in spare time while still learning! From here it's a short step to your own *full-time* Radio Shop or a good Radio job!

Future for Trained Men is Bright in Radio, Television, Electronics

It's probably easier to get started in Radio now than ever before because the Radio Repair business is booming. Trained Radio Technicians also find profitable opportunities in Police, Aviation, Marine Radio, Broadcasting, Radio Manufacturing, Public Address work. Think of even *greater* opportunities as Television and Electronics become available to the public!

Find Out What N. R. I. Can Do For You

Mail Coupon for Sample Lesson and my 64-page book. Read the details about my Course. Read letters from men I trained, telling what they are doing, earning. See how quickly, easily you can get started. No obligation! Just MAIL COUPON NOW in an envelope or paste it on a penny postal. J. E. SMITH, President, Dept. 7BH, National Radio Institute, *Pioneer Home Study Radio School*, Washington, 9, D. C.

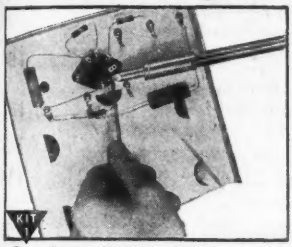
Our 33rd Year of Training Men for Success in Radio

A TESTED WAY

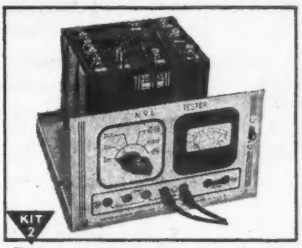
OWN BOSS

LEARN RADIO BY PRACTICING IN SPARE TIME

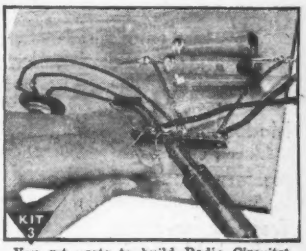
with Big Kits of Radio Parts I Send You!



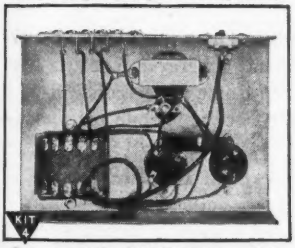
I send you Soldering Equipment and Radio Parts; show you how to do Radio soldering; how to mount and connect Radio parts; give you practical experience.



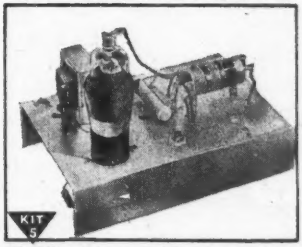
Early in my Course I show you how to build this N.R.I. Tester with parts I send. It soon helps you fix neighborhood Radios and earn EXTRA money in spare time.



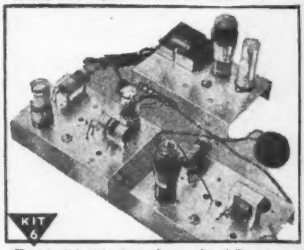
You get parts to build Radio Circuits; then test them; see how they work; learn how to design special circuits; how to locate and repair circuit defects.



You get parts to build this Vacuum Tube Power Pack; make changes which give you experience with packs of many kinds; learn to correct power pack troubles.



Building this A. M. Signal Generator gives you more valuable experience. It provides amplitude-modulated signals for many tests and experiments.



You build this Superheterodyne Receiver which brings in local and distant stations—and gives you more experience to help you win success in Radio.

SAMPLE LESSON FREE

I will send you a FREE Lesson, "Getting Acquainted with Receiver Servicing," to show you how practical it is to train for Radio at home in spare time. It's a valuable lesson. Study it—keep it—use it—without obligation! Tells how Superheterodyne Circuits work, gives hints on Receiver Servicing, Locating Defects, Repair of Loudspeaker, I.F. Transformer, Gang Tuning, Condenser, etc. Thirty-one illustrations.

TO GOOD PAY

MAIL COUPON FOR FREE LESSON AND 64-PAGE BOOK

Good for Both FREE

Mr. J. E. SMITH, President, Dept. 7BH
National Radio Institute, Washington 9, D. C.

Mail me FREE, without obligation, Sample Lesson and 64-page book about how to win success in Radio—Television, Electronics. (No salesman will call. Please write plainly.)

Age.....

Name .....

Address .....

City..... Zone..... State.....

CONTENTS

(Continued from page 2)

CRAFTS AND HOBBIES

Pipe Station 110
For pipe, tobacco and cleaners—and everything in its place

Miniature Treasure Chest 112
An exquisite jewel box

Modern Home From Mud 114
Adobe brick as strong as concrete

Turned Bud Vase 119

Boats and Boating by William F. Crosby 120
This month: Repairing cabin top leaks

Handy Hamper 122
A one-hand soiled shirt depository

Mr. Mulligan 124
A 39 in. control-line gas job model of the 1935 Thompson and Bendix Air Race winner

Modulamp 130
A combination ham modulator and amplifier

Nursery Table and Chair 132
Sturdy furniture for the small-fry

Tree Conservation by J. Modrock 134
Tree surgery you can do

Home and Shop Tips 138

MI Plans 141

Car Care 142

Behind the Wheel with Fred Russell 143
Trouble with the bus? Ask Russell.

Monthly Photo Contest 144

Professional Movie Titles 145
Made with non-reversing film

Deluxe Album 146
No reason now to keep your snapshots in a shoe box

Kodachrome Adaptor 148
An accessory to permit large cameras to use Bantam-size Kodachrome

Print Dryer 150
A one evening project

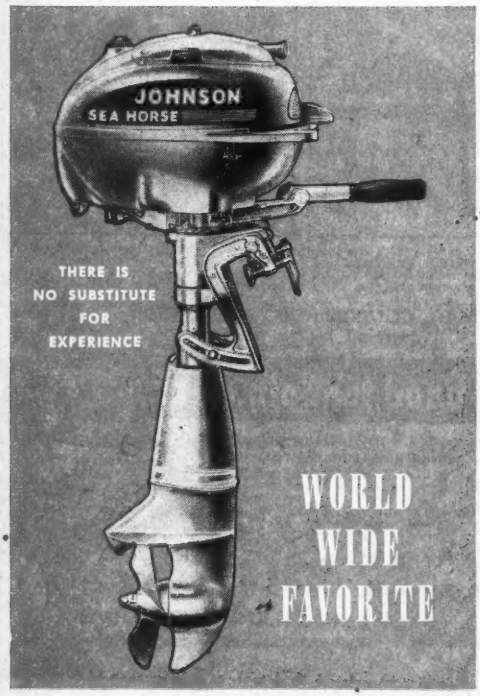
Numbers on Your Holders 151

Photo Kinks 152

Modern Mantel Clock 154
Look—no numbers!

Folding Book Trough 156

One Night Specials 158



This is the outboard motor that leaves its wake around the world! Wherever men use boats the Johnson Sea-Horse is a familiar sight. It is a world wide favorite for one big reason—

DEPENDability

It offers users the simplicity and reliability of twin cylinder construction. It has *all* features that contribute to brilliant performance. Remember, outboard motoring's great improvements (Alternate Firing, Reverse, Dual Carburetion, and others) are *Johnson* developments.

FREE HANDY CHART: New. Describes the 1947 line. Write for it. See your Johnson dealer about delivery. Look for his name under "Outboard Motors" in your classified phonebook. JOHNSON MOTORS, 200 Pershing Road; Waukegan, Ill.

FIVE GREAT MODELS FOR 1947

Small Alternate Firing Twin . . 2.5 H.P.
Medium Alternate Firing Twin . 5.0 H.P.
Large Alternate Firing Twin . . 9.8 H.P.
Super Alternate Firing Twin . 16.0 H.P.
Heavy Duty Opposed Twin . . 22.0 H.P.

All H. P. ratings are O. B. C. Certified Brake Horsepower at 4000 r. p. m.

INVENTORS

The patent laws provide that any new and useful art, machine, article of manufacture, composition of matter, or design, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the patent laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of 17 years.

The patent laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent in order to comply with the requirements of the U. S. Patent Office. For that reason, the Patent Office advises the inventor to engage a competent registered patent attorney to prepare his application for patent and represent him before the U. S. Patent Office Examiner.

A specially prepared booklet containing detailed information with respect to patent protection and procedure will be forwarded to you without obligation upon request.

Patents

Trademarks

Copyrights

Registered Patent Attorneys

CLARENCE A. O'BRIEN & HARVEY B. JACOBSON

73-B District National Building + Washington 5, D. C.

CLARENCE A. O'BRIEN & HARVEY B. JACOBSON
Registered Patent Attorneys
73-B District National Bldg., Washington 5, D. C.

Please send me booklet containing information regarding patent protection and procedure, and also "Record of invention" form. This request does not obligate me.

Name_____

Address_____

City_____ State_____

(Please write or print plainly.)

SO IT NEEDS FIXING

By S. T. CHRISTENSEN
the "Fix-it Man"

"WELL, I guess I'm the fellow to see, for I've repaired thousands of refrigerators (home and commercial both), vacuum cleaners, radios, washing machines, irons, fans, lamps, mangles, motors, etc. In fact, many of my customers call me their "electrical appliance doctor." And, "doctoring," I might add, has paid me a good substantial income for quite a few years. Funny, in a way, how I got started. Always liked to tinker and by experimenting around I found that most electrical appliances had many things in common. That, regardless of what the appliance was used for, or who the manufacturer was, the basic principles were much the same. From fixing my own appliances to fixing friends' and then for strangers at a fee, seems now to have been but a small step.

What to Charge?

At first, I let the owner decide the charge and frankly, I was amazed at what I earned per hour. But then, when one figures what initial costs are involved in buying most electrical appliances, one can readily see that spending extra dollars for repairs is well worth while. Before long I was making more in my spare time repairing than from my regular job. The result . . . I went into business for myself. When war came, business boomed, for new appliances were not available.

For a while, repair parts (needed on some jobs) were a little difficult to get. But that situation quickly adjusted itself and many repair parts were given the high priority rating of AA2. After all, we had to provide for the health and well-being of our civilian population.

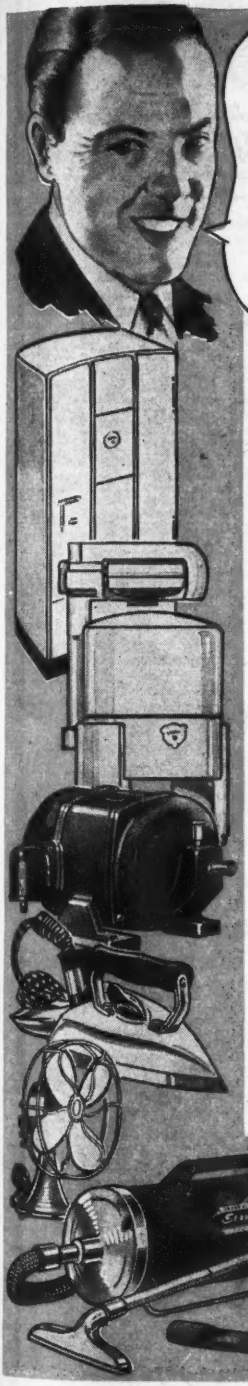
The Future Offers

Friends ask me about my future. And, I think I've got a grand one. Age is no handicap in repairing. I have in my files enthusiastic letters from repairmen ranging in age from 18 to 79 years. Now the war is over we are certain to see hundreds of new products on the market . . . products that the average person never dreamt of. These new products and our old appliances are all going to need at some time or other "fixing." Well, I'll still be the fellow to do it. The field open for appliance repairmen is unlimited. I don't worry at all about too much competition.

If You Are Ambitious

To the contrary, I've prepared a complete course, chuck full of simple, easy to understand photos and drawings and written in the same non-technical language as this article. I know the course is good, because I have hundreds of men all over the country writing to me telling me how the course has helped swell their pockets with cash. If you too want to prepare now for your future, I suggest you read the next page and send me the handy coupon."

Advertisement



BIG MONEY INDEPENDENCE

A PROFITABLE LIFETIME BUSINESS OF YOUR OWN!

LEARN ELECTRICAL APPLIANCE REPAIRING

PREPARE NOW FOR THE FUTURE

If now employed, start your home appliance repair business NOW in your spare time and be set with a business of your own no matter what happens. You don't need elaborate fixtures or expensive equipment to be a successful repairman. Operate from your garage, basement, vacant store, etc. Work as many hours as you wish—the home appliance repairman is his own boss. It is a profitable occupation for on many types of repairs it is not unusual for a repairman to charge on the basis of $5.00 to $6.00 per hour. Don't gamble with your future—learn a trade that will always support you. Remember, as long as electrical appliances are used, there will be a need for electrical appliance repairmen.

If you are at all mechanically inclined—can hold and use tools—then you have all of the qualifications required for becoming a big money earning home appliance repairman. It does not matter if you have not had a great deal of schooling or had previous experience along these lines—WE WILL TEACH YOU. Age should be no barrier—nor should any minor physical handicap.

New Course Tells All

Profusely illustrated, our new course shows you in simple, easy to understand language and drawings how to make each repair on refrigerators, vacuum cleaners, washing machines, motors, etc. Explains and gives you a working knowledge of electricity, welding, nickel plating, etc. Shows you how to build the power tools you need and how to solicit and keep business coming to you. Not a theory course but an honest to goodness course written by and used by repairmen the country over. Price of course is so low that the savings on your own household appliance repairs will quickly pay for it. Act now! Mail the handy coupon below today.

Read What Our Students Say About Course

I really believe your course the best investment a mechanically minded man can make.—Claude E. Allen, Indianapolis, Ind.

I have received your Course in Appliance Repairing and I must say I am well pleased with same. I am only sorry I did not have said Course some years ago. I have learned so much more through this course I would not part with it.—Charles Schwarz, Hamilton, Ohio.

The Course in Appliance Servicing arrived a few days ago. Want to take out a few minutes of my valuable time to let you know that this is just what I have been looking for ever since I opened up my Fix-It shop. I must admit that you told the truth, when you said that it contains quite a bit more information than I bargained for.—P. J. Breti, Sebring, Ohio.

I am a mechanic for the Western Union Telegraph Co. Three days after receiving the lessons in refrigeration I earned the exact cost of the course.—Henry S. Lee, Washington, D. C.

I work day times at the shipyard and after 4:00 P.M. I operate from my cellar and garage. I average $10.00 to $15.00 clear every day.—Walter Hanby, Brockton, Mass.

GET STARTED TODAY — MAIL THIS COUPON

CHRISTY SUPPLY CO.
2835 N. Central Ave., Dept. D-3906
Chicago 34, Illinois

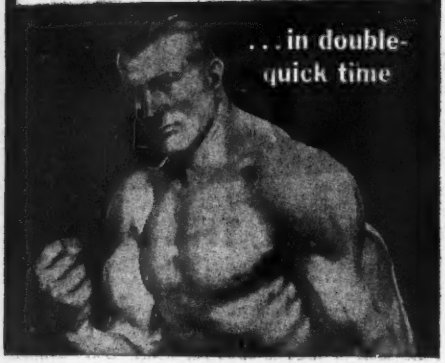
Please send me free illustrated literature about America's Fastest Growing Industry—ELECTRICAL APPLIANCE REPAIRING.

Name .....

Address .....

City ..... State .....

"I'll show YOU how to make yourself COMMANDO-TOUGH



...OR IT WON'T COST YOU A CENT!"

says *George F. Jowett*

WORLD'S GREATEST BODY BUILDER

Let me prove to YOU that you can put inches of dynamic muscles on your arms! Add inches to your chest! Broaden your shoulders and power-pack the rest of your body. I can do for you what I've done for thousands the world over, including many officers and men now in the U. S. and British Armed Forces.

GIVE ME 10 MINUTES A DAY!

I'll Show You My Secrets Of Body Building

I'll help you learn the "Progressive Power Method" through which I rebuilt myself from a physical wreck to the holder of more strength records than any other living athlete or teacher! No matter how skinny or flabby you are, you can learn my methods right in your own home. Through my proved secrets I show you how to develop your power, inside and out, until YOU are fully satisfied that you are the man you want to be. "The Jowett System," says R. F. Kelly, Physical Director of the YMCA, Atlantic City, "is the greatest in the world!"

PROVE TO YOURSELF IN ONE NIGHT!

Send only 25c for test Course, "Molding a Mighty Arm." Read it the evening it arrives—learn from experience the thrill you can give your muscles!

SEND FOR THESE FIVE FAMOUS COURSES IN BOOK FORM

ONLY 25c EACH or ALL 5 for $1.00

If you want a physique that will inspire respect from men, and admiration from women . . . ACT LIKE A HE-MAN! Decide at once! The famous book, "Nerves of Steel—Muscles Like Iron" will be included FREE! Priceless for the strength fan! Full of photos of marvelous power-bodied men who will show you what Jowett has done for them and how he can do the same for you. Reach out . . . Grasp this Special Offer today!

Jowett Institute, Dept. MI-72
230 Fifth Avenue
New York 1, N. Y.

QUICK ACTION BRINGS

THIS BOOK FREE!

PHOTO BOOK OF FAMOUS STRONG MEN FREE

George F. Jowett Champion of Champions

Jowett Institute of Physical Culture
230 Fifth Avenue, New York 1, N. Y. **DEPT. MI-72**

George F. Jowett: Your proposition looks good to me. Send by return mail, prepaid, the courses checked below, for which I enclose ( ). Include FREE book of PHOTOS.

☐ All 5 courses for.....$1 ☐ Molding Mighty Legs 25c
☐ Molding a Mighty Arm 25c ☐ Molding a Mighty Grip 25c
☐ Molding a Mighty Back 25c ☐ Molding a Mighty Chest 25c
☐ Send all 5 C.O.D. ($1 plus postage.) No orders less than $1 sent C.O.D.

NAME..... Age.....
(Print name)

ADDRESS .....

AUTO BOOKS ON APPROVAL

CAN YOU FIX IT?
These wonder books tell step by step HOW to make difficult repairs and adjustments, how to keep a car at maximum efficiency, including latest improvements in car design and operation. Engine troubles and how to correct them well covered.

6 BIG VOLUMES
2800 pages, 2000 illustrations, wiring diagrams, etc., including Diesel engines. Beautiful modernistic, washable cloth binding.

SEND NO MONEY. Just mail the coupon for a complete set of Six Big Auto Books, 20th Edition. Whether you are a mechanic or helper, expert or apprentice, auto owner or driver, take immediate advantage of this FREE EXAMINATION OFFER.

MAKE GOOD MONEY NOW HOLD A PERMANENT JOB

America wants its automobiles kept in good repair. Men with "know how" are in demand, at big pay. These books will help you get and hold an important job, or give you a chance to go into business for yourself now or later. Any man who half tries to improve himself can learn auto servicing and repairing by this quick reference method. Use the JIFFY INDEX to find easily understood answer to any auto problem. These wonder books prepared by eleven of America's great automobile engineers. Many hundreds of valuable illustrations. Send the coupon TODAY.

[A year's consulting privileges with our engineers now given with these books without extra charge.]

Vocational Publishers Since 1898

AMERICAN TECHNICAL SOCIETY, Dept. A2320
Drexel Ave. at 58th St., Chicago 37, Ill.

I would like to examine your Six-Volume Set of Auto Books. I will pay the delivery charges only, but if I choose I may return them express collect. If after 10 days' use I prefer to keep them, I will send you $2 and pay the balance at the rate of only $3 a month until $24.80 has been paid. Please include consulting service as offered above.

Name .....
Address .....
City ..... State.....
Please attach letter stating age, occupation, employer's name and address, and name and address of at least one business man as reference. Men in service, also please give home address.

Learn this Profitable Profession

IN 90 DAYS AT HOME

Money-Making Career Open to Men and Women, 18 to 50

Hundreds of men and women between 18 and 50 make $10 to $20 in a single day giving scientific Swedish Massage and Hydro-Therapy treatments. There is big demand from doctors, hospitals, sanitoriums and clubs. Graduates earn large full time incomes from these or in private practice in their own offices. Others make good money from home treatments given in spare time. Learn this interesting, money-making profession in your own home, through our home study course. Same instructors as in our nationally known resident school. You can win independence and prepare for future security by qualifying for your Diploma. Course can be completed in 3 to 4 months. Many earn while they learn. Begin your training at once.

Anatomy Charts & Booklet FREE

Enroll now and we will include, at no extra cost, many needed supplies. Fit yourself to help meet growing demand for Scientific Swedish Massage. Send the coupon at once for complete details, Anatomy Charts and 32-Page Illustrated Booklet, FREE, postpaid.

THE COLLEGE OF SWEDISH MASSAGE
Dept.758B, 100 East Ohio St., Chicago 11, Illinois

Please send me FREE and postpaid, Anatomy Charts, 32-page Booklet and complete details on Home Training.

Name.....
Address.....
City.....State.....

INVENTORS

Patent Laws Encourage The Development Of Inventions

The Rules of Practice of the U. S. Patent Office advises—unless an inventor is familiar with such matters—that he employ a competent registered attorney, as the value of patents depends largely upon the skillful preparation of the specifications and claims.

The firm of McMorrow, Berman and Davidson is registered to practice before the U. S. Patent Office. Additionally, it maintains a staff of attorneys able to readily understand inventors' disclosures, to advise concerning patentability, and to prepare appropriate specifications and claims for filing with the Patent Office.

If an inventor believes he has an invention, a search of the most pertinent prior U. S. patents should be made and a report obtained relative to its patentability. Where such report indicates that the invention appears patentable, in order to secure protection, diligence should be exercised in making application for a patent.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS — TRADE MARKS — COPYRIGHTS

1391 VICTOR BUILDING, WASHINGTON 1, D. C.

McMORROW, BERMAN & DAVIDSON
Registered Patent Attorneys
1391 Victor Building, Washington 1, D. C.

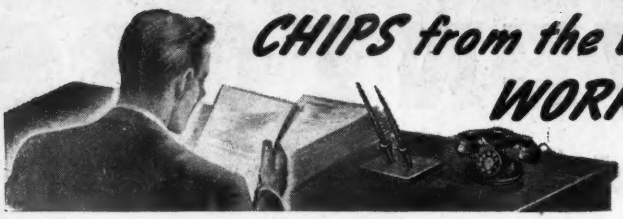
Send me further particulars as to patent protection and procedure and "Invention Record" form at once. I understand that this request does not obligate me.

Name.....

Address.....

City..... State.....

(WRITE OR PRINT NAME CLEARLY)



CHIPS from the EDITOR'S WORK BENCH

Operation Roger

The Army Air Forces wants the up-to-date addresses of its two million and a half former members and hopes to get them through Operation Roger. This is a gigantic plan to send dotted-line cards to all post offices and sub-stations in the United States. They will be distributed to airmen by the Civil Air Patrol and the Boy Scouts of America.

General Carl Spaatz, commanding general of the Army Air Forces, says that the names and whereabouts of these veterans, who built up the greatest team in history and delivered the bombs to Berlin and Tokyo, are needed so that the men may be "kept informed of latest developments, plans of the Air Reserve program, and other related subjects."

Mighty Magnet

A mighty electromagnet, capable of exerting a pull of 4,000 pounds, has been developed by Westinghouse for the purpose of making permanent magnets and for studying the magnetic properties of various metals.

In appearance, it is a squat, U-shaped core of iron wound with 6,000 turns of square copper wire. It is five feet long, two and one-half feet high and weighs 3,000 pounds.

One secret of the high magnetism produced is the use of a special metal alloy at the tips of the poles. This alloy does not "saturate" with magnetism as rapidly as do other alloys, it is claimed.

The air-space between the poles can be varied from a half-inch to 12 inches. Enormous heat is generated by the 28,000 watts of power used in the wire coils, but this is carried off by oil circulating through the coils at the rate of 17 gallons a minute.

5,000 Sky Horses

The U. S. Army's new 5,000-horsepower aircraft engine, the XR-7755, produces more power than the average locomotive and is the most powerful reciprocating aviation engine in the world today, officials of the Army Air Forces claim.

It is a Lycoming model with 36 cylinders, liquid cooled, and with a single crankshaft. Its radial cylinders are arranged in four rows of nine each. A few of the accessories are mounted conventionally at the rear of the engine, but others, including the two starters necessary, tachometers, propeller governor, and its low-tension magnetos and distributors, are located ahead of the cylinders.

The engine is approximately 10 feet long and five feet in diameter and is equipped for either carburetion or fuel injection. When operating at maximum speed and power, it will consume gasoline at approximately 580 gallons an hour.

Since economy of operation was one of the primary objectives in designing this engine, several unique features are incorporated. The propeller drive is through a two-speed dual rotation reduction gear, either ratio of which can be used at the pilot's discretion. The shifting is accomplished hydraulically and provides a direct drive to each of the two propeller shafts without the use of a friction clutch.

Another feature is the use of camshafts, with two separate sets of cams which can be shifted to change the valve timing for maximum power or cruising efficiency.

Green Light for FM

The Federal Communications Commission has decided to make no further changes in the wavelengths assigned to FM (frequency modulation) radio broadcasting. So now you can watch for these developments:

Manufacturers will start making FM sets for the general public.

Radio broadcasters will build and erect transmitters.

Until the freezing of the FM frequencies, manufacturers were afraid to start manufacturing and

[*Continued on page* 14]

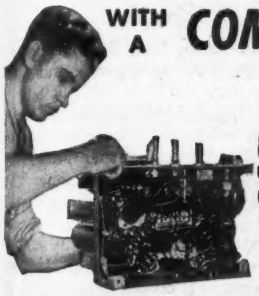
MI FLYING FISHERMAN

Here is a good looking job (the girl too) which Alfred Williams of Guelph, Ont., Can., built with the aid of his brother. Plans for the "Flying Fisherman" originally appeared in MI. Mr. Williams, besides lauding the boat, sends a bouquet, ". . . MI is the liveliest and most progressive magazine of its type on the market." Thank you, Bill. We nearly forgot, a Workbench Award and a $10.00 check are on the way.

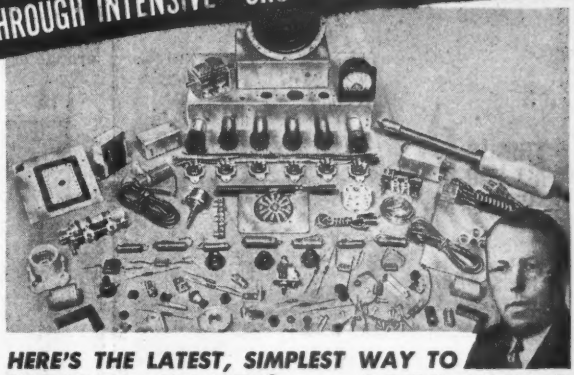
NOW SPRAYBERRY RADIO TRAINING GIVES YOU

8 BIG KITS OF RADIO EQUIPMENT

WITH A COMPLETE 6 TUBE SUPER-HETERODYNE RECEIVER



YOU LEARN RADIO SERVICING THROUGH INTENSIVE "SHOP-BENCH" PRACTICE



YOU DO EXPERIMENTS, CONSTRUCTION, TROUBLE-SHOOTING

I'll show you how to perform over 175 instructive Experiments—how to build countless Radio Circuits. You'll learn a new, fast way to test Radio Sets without mfg. Equipment.

I give you a fine, moving-coil type Meter Instrument on Jewel Bearings—with parts for a complete Analyzer Circuit Continuity Tester. You learn how to check and correct Receiver defects with professional accuracy and speed.

You'll get valuable experience and practice building this Signal Generator and multi-purpose Tester. Makes a breeze out of fixing Radios and you don't have to spend money on outside, ready-made equipment.

Soldering, wiring, connecting Radio parts . . . building circuits with your own hands—you can't beat this method of learning. When you construct this Rectifier and Filter, Resistor and Condenser Tester, etc., you get a really practical slant on Radio that leads to a money-making future.

HERE'S THE LATEST, SIMPLEST WAY TO TRAIN at HOME for a GOOD LIVING in RADIO-ELECTRONICS & TELEVISION

I train your *mind* by putting you to work with your *hands* on a big 6-Tube Superheterodyne Receiver. And, believe me, when you get busy with real Radio Parts — 8 big Kits of them — you really LEARN Radio and learn it RIGHT! You get the practical stuff you need to be *useful* in Radio, and that's what it takes to make money. You don't have to worry about what to do with these 8 Kits of Parts. Step by step, I show you how to build circuits, test, experiment, trouble-shoot. And you don't need any previous experience. The Sprayberry Course starts right at the beginning of Radio! You can't get lost! Simplified lessons, coupled with real "Shop" practice, makes every subject plain and easy to understand and remember.

A BUSINESS OF YOUR OWN . . . OR A GOOD RADIO JOB

Soon after you begin Sprayberry Training, I'll send you my sensational BUSINESS BUILDERS. You'll find out how to get and do neighborhood Radio repair jobs for nice profits and rich experience while learning. This sort of work can easily pave the way for a Radio Service business of your own. But with Sprayberry Training, you're not limited. You can swing into any one of the swiftly expanding branches of Radio-Electronics INCLUDING Radio, Television, FM, Radar, Industrial Electronics. Be wise! Decide now to become a fully qualified RADIO-ELECTRONICIAN. Get full details about my Training at once! Mail coupon below for my 2 big FREE Books.

SEND FOR THESE FREE BOOKS

"How to Read Radio Diagrams and Symbols"

Here's a valuable and wonderfully complete new book which explains in simple English how to read and understand any Radio Set Diagram. Includes translation of all Radio symbols. Send for this volume at once! It's free! Along with it, I will send you another Big Free book describing in detail my Radio-Electronic Training.

MAIL COUPON TODAY!

SPRAYBERRY ACADEMY OF RADIO
F. L. Sprayberry, President, Room 1527, Pueblo, Colorado

Please rush my FREE copies of "How to MAKE MONEY in RADIO, ELECTRONICS and TELEVISION," and "HOW to READ RADIO DIAGRAMS and SYMBOLS."

Name ..... Age .....

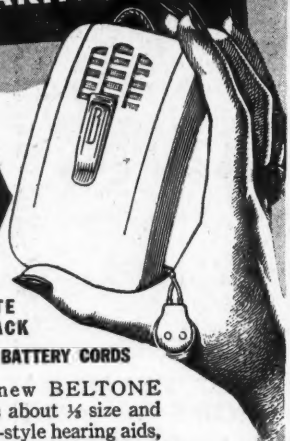
Address .....

City ..... State .....

(Mail in envelope or paste on penny postcard)

Now! The ONE-UNIT
HEARING AID
Thousands Have Waited For

THE NEW ONE-UNIT
Beltone
MONO-PAC
HEARING AID



THIS IS ALL YOU WEAR

NO SEPARATE BATTERY PACK

NO DANGLING BATTERY CORDS

The tiny new BELTONE Mono-Pac is about ⅓ size and weight of old-style hearing aids, yet so powerful you hear even *whispers!* Get helpful facts about this new "MIRACLE" aid in valuable FREE book about deafness.

BELTONE HEARING AID CO.
1450 W. 19th St., Chicago 8, Ill.
Dept. MI-72

FREE BOOKLET

Beltone Hearing Aid Co.
Dept. MI-72, 1450 W. 19th St., Chicago 8, Ill.
Please send me FREE booklet about deafness and what can be done to overcome it.

Name.....
Address.....
Town..... Zone..... State.....

Editor's Workbench Chips

[*Continued from page* 12]

broadcasters were not sure what kind of stations to build.

FM broadcasting differs from the standard kind mainly because it operates on very high frequency portions of the radio spectrum. The principal advantages of these frequencies is that they are practically static-free. The range of FM stations is the same day and night, but the range is limited under ordinary conditions to about 100 miles.

Sweetest Thing Yet

New sweetness has come to a world troubled with a sugar shortage. It is a new compound 4,000 times as sweet as sugar.

Developed in the Netherlands during the war, the new substitute, referred to by chemists as "N-Propoxy," is derived from benzene and is by far the sweetest substance known to man. The tiniest pinch placed on the tongue will be tasted a half hour later.

Saccharin, derived from coal tar, is only 200 to 700 times as sweet as sugar compared with N-Propoxy's 4,000 figure. It comes in the form of orange crystals.

"SNUFFY" IN AFRICA

Constructed from MI plans, the seaworthy little boat pictured above is the work of Mr. Percy L. Ely of Durban, Natal, whose wife and daughter are shown enjoying a ride. A $5 Workbench Award is on its way across the sea to Mr. Ely for his fine workmanship.

Movies in 15 Seconds

Now you can be photographed by a movie camera and see your picture on the screen 15 seconds later.

It's done by a new automatic machine which is a combined camera, processing cabinet, and projector using special 16-millimeter film to provide continuous, exposure-to-projection photography.

In operation, the machine pulls the film intermittently along a track inside a light-tight camera on which the pictures are recorded at intervals. As the exposed film passes on it receives a few drops of hot chemicals, applied by a squirt-gun

[*Continued on page* 18]

PATENT PROTECTION *for* INVENTORS

A PATENT IS A VALUABLE RIGHT

On the basis of a constitutional provision Congress has established a system under which inventors may secure the exclusive right to prevent the unauthorized use, manufacture and sale of their inventions for periods of seventeen years. The inventor secures this protection by obtaining a patent from the United States Patent Office.

The United States Patent Office RECOMMENDS

in its Rules of Practice that "an applicant is advised, unless familiar with such matters to employ a competent registered patent attorney or registered patent agent, as the value of patents depends largely upon the skillful preparation of the specifications and claims."

We RECOMMEND

that you authorize us to conduct a search through the U. S. Patents pertinent to your invention and submit a report setting forth our opinion regarding its patentability.

VICTOR J. EVANS & CO., has a staff of experienced registered patent attorneys, available to represent inventors in the preparation and prosecution of their cases before the Patent Office. Detailed information and the steps to be taken in obtaining patent protection will be furnished upon request.

FORM BELOW FOR MAILING CONVENIENCE

VICTOR J. EVANS & Co.

Merlin M. Evans

REGISTERED PATENT ATTORNEY

250-B MERLIN BUILDING, WASHINGTON 6, D. C.

Please forward to me detailed information regarding procedure to obtain Patent Protection, together with your convenient "Evidence of Invention" form.

Name .....

Address .....

City and State .....

PATENTS • TRADEMARKS • COPYRIGHTS

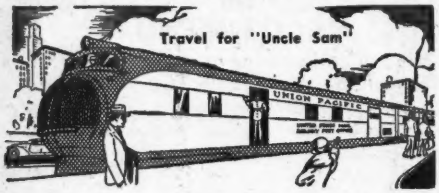
Start $1,756 to $3,021 a Year

Get Ready Now for 1947 Examinations In Your Section

Veterans Get Preference

Railway Postal Clerks

Railway Postal Clerks get $2,300 the first year regular, being paid on the first and fifteenth of each month. ($95.70 each pay day.) Their pay is automatically increased yearly to $3,400. Advance may be had to Chief Clerk at $5,400 a year. ($225.00 each pay day.) Men 18 to 35.



3 Days On—3 Days Off—Full Pay

Railway Postal Clerks on long runs usually work 3 days and have 3 days off duty or in the same portion. During this off duty their pay continues just as though they were working. They travel on a pass when on business. When they grow old, they are retired with a pension.

City Mail Carriers, Post Office Clerks

Clerks and Carriers now get $2,100 the first year on regular and automatically increase $100 a year to $3,100. Open to men, women 18 to 50.

Many Other Positions

Many other positions are obtainable. Rural Carriers—Stenographers—Typists—Assistant Statistical Clerks—Customs Inspectors—Office Machine Operators—etc. Those wishing these positions should qualify at once.

Get Free List of Positions

Fill out the following coupon. Tear it off and mail it today—NOW, at once.

This investment can result in your getting a big-paid government job.

FRANKLIN INSTITUTE, Dept. D79, Rochester 4, N. Y.

Rush to me, entirely free of charge (1) a full description of U. S. Government Jobs; (2) Free copy of illustrated 32-page book, "How To Get A U. S. Government Job"; (3) List of U. S. Government Jobs; (4) Tell me what to do to prepare for one of these jobs.

Name .....

Address ..... Vet? .....

Use This Coupon Before You Mislay It. Write or Print Plainly.

-4

Now for EVERY WORK SHOP!

NEW Invention Electroplates by BRUSH

Easy to Plate CHROMIUM GOLD, SILVER, NICKEL, COPPER

. . . For Pleasure and Profit!

If you have a workshop—at home or in business—you need this new Warner Electroplater. At the stroke of an electrified brush, you can electroplate models and projects—you can replate worn articles, faucets, tools, fixtures, silverware, etc. with a durable, sparkling coat of metal . . . Gold, Silver, Chromium, Nickel, Copper or Cadmium. Method is easy, simple, quick. Everything furnished—equipment complete, ready for use. *By doing a bit of work for others, your machine can pay for itself within a week.* So make your shop complete by getting a Warner Electroplater right away. Send today for FREE SAMPLE and illustrated literature. ACT AT ONCE! *Mail Coupon.*

WARNER ELECTRIC CO., DEPT. L-75
1512 Jarvis Avenue, Chicago 26, Ill.

FREE *Details & Sample!*

WARNER ELECTRIC CO., 1512 Jarvis Avenue, Chicago 26, Dept. L-75

Gentlemen: Send Free Sample and Details to:

*Name*_____

*Address*_____

City *State*

Do you want

..to go to College?

..or to enter a Profession?

(Such as Accounting, Architecture, Nursing, Dentistry, Teaching, Social Work, Osteopathy, Beauty Culture, Optometry, Embalming, Chiropody, Law, Medicine, etc.)

..or get an Office Position?

To get anywhere, you practically MUST finish High School FIRST. You can complete our simplified High School Course in SPARE time at home, as FAST as your time and abilities permit. Equivalent to resident school work—prepares you for college, pre-professional examinations, business, industry. Standard texts furnished. Diploma. Credit for H.S. subjects already completed. Single subjects if desired. Low tuition, easy terms. American School, Chicago, est. 1897—endorsed by educators. Finish your high school education NOW. Write TODAY!

High School Course at Home — Many Finish in 2 Years

American School, Dept. H-228, Drexel Ave. at 58th St., Chicago 37, Ill.

Gentlemen: Send me FREE information covering special training in subjects checked below. No obligation on my part.

- ☐ High School Course
- ☐ Electronics, Industrial
- ☐ Architecture and Building
- ☐ Automotive Engineering
- ☐ Business Management
- ☐ Electrical Engineering
- ☐ Elec. and Gas Refrigeration
- ☐ Air Conditioning
- ☐ Railway Training
- ☐ Diesel Engineering
- ☐ Drafting and Design for Men and Women
- ☐ Plastics
- ☐ Private Secretary
- ☐ Mechanical Engineering
- ☐ Aviation ☐ Radio
- ☐ Salesmanship

Name .....

Address .....

Selected as one of the Nation's Foremost

RADIO-ELECTRONICS courses of DeForest's Training, Inc. recommended by the New York Museum of Science and Industry

DeForest's Training, Inc. wins Museum's Certificate of Merit for Home Study and Residence courses...First school of its kind to be so honored

ELLERY L. PLOTTS,
Nationally Known Radio Station Consulting Engineer

Nationally Known Radio Engineer Endorses DeForest's Training, Inc.

"The Home Study course of DeForest's Training, Inc., is a short cut to the fascinating and profitable field of Radio and Electronics," says Ellery L. Plotts, nationally known radio station consulting engineer and former special research associate at Harvard University's Radio Research Laboratories.

"Now is the time . . . to prepare to enter the field of Radio and Electronics . . . No greater opportunity is afforded the high school student . . . the war veteran . . . or the man who wants to make more money," says Ellery L. Plotts, nationally known radio station consulting engineer and former special research associate at Harvard University's Radio Research Laboratories.

"Investigation reveals that these DeForest's Training, Inc., courses are as modern as they are thorough. Each home study student has the use of a motion picture projector, which gives advantages heretofore unknown in home study training. The comprehensive kits of Radio parts are unusually valuable inasmuch as they enable a man to get practical, on-the-job experience in his own home. Further study enables me to highly recommend either the home study or resident course," says Ellery L. Plotts.

Enjoy Real Movies at Home

Through the courses of DeForest's Training, Inc., you not only learn-by-doing and reading, but you also have the use of a motion picture projector and 12 reels of film. No other course affords this opportunity to learn important Radio fundamentals faster and easier at home. DeForest's Training, Inc., also includes instruction in Motion Picture Sound Equipment, FM Radio and Television.

Choose This Selected Course for Radio-Electronic Training

DeForest's Training, Inc., only, gets you off to a brighter future by supplying "ALL 4" of these major training benefits AT HOME . . . (1) Learn-By-Seeing Movies, (2) Illustrated Loose-Leaf Lessons, (3) Learn-By-Doing Radio Equipment and (4) Employment Service.

8 Kits of quality Radio parts provide the practical experience you need . . . enabling you to build and operate SEVEN different Radio Receivers, a Radio Telephone, Wireless Microphone, Photo Electric Cell Devices and dozens of other marvels in this Electronic Age.

Get the complete facts now and see how quickly YOU may get started toward this field of outstanding opportunity. Mail the coupon today.

Says Course Is Worth Many Times Cost

"I think the visual training part of your course is 'tops'! I think your course is worth many times more than what you actually charge for it. I truly believe this is the field to get into for any man interested in a real future and the welfare of his family's peace and security."

HAROLD J. ELLIOTT,
701 Miller Ave., Ann Arbor, Michigan

WRITE TODAY FOR FREE INFORMATION

DeFOREST'S TRAINING, INC.
2533-41 N. Ashland Ave., Dept. MI-D2
Chicago 14, Illinois, U. S. A.

Send me your big book "VICTORY FOR YOU," showing how I may make my start in Radio-Electronics with your modern home training plan. No obligation.

Name.....Age.....

Address.....Apt.....

City.....Zone.....State.....

☐ If under 16, check here for special information.

☐ If a discharged veteran of World War II, check here.

DeFOREST'S
TRAINING, INC.
CHICAGO, ILLINOIS

PYROIL *an old friend for your* NEW CAR!

Automobiles get old first inside. Metal to metal contact of piston and cylinder means wear . . . corrosion . . . deterioration. Pyroil gives oil the quality of adhering to cylinder walls . . . of providing constant lubrication to prevent metal to metal contact and wear. Pyroil makes starting easier and reduces battery drain. Whether you are the proud owner of a new car or still driving a pre-war model . . . you will get added miles by adding Pyroil. Ask your gas station attendant.

Pyroil for Aircraft Engines

Use Aircraft Pyroil B for lubricating oil, Aircraft Pyroil A for gasoline.

Manufactured and Guaranteed by Pyroil Company, 199 Main Street, La Crosse, Wisconsin.

PYROIL COMPANY
199 Main Street, La Crosse, Wisconsin

I want my car to last and run properly. Please tell me more about Pyroil and how it can accomplish this for me.

Name .....

Address .....

City or Town..... State.....

Jerry, the talking dog, is entertaining hospitalized veterans, by courtesy of the PYROIL Company. Picture of Jerry, sent on request.

Editor's Workbench Chips

[*Continued from page* 14]

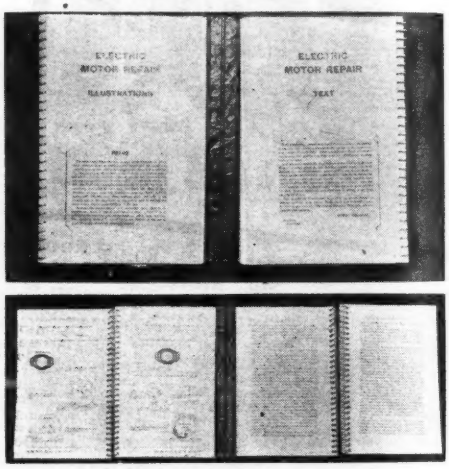
Because of the high temperature, processing is complete in about nine seconds.

The nearly dry film is pulled into the projection system where air pressure completes the drying, cools it, and holds it flat during immediate projection on the screen.

100 Years Of Edison

Many things have been written about the accomplishments of Thomas A. Edison, whose 100th birthday anniversary will be observed February 11. His name is almost synonymous with the electric light, the motion picture and the phonograph.

But not many know how versatile this man really was. Older readers will recall that "he had something to do with the telephone;" in fact, it was his transmitter that made possible the transmission of the voice in ordinary tones and, indeed, was the forerunner of the modern radio microphone. Fewer people will remember that he helped to develop the typewriter.



ELECTRIC MOTOR REPAIR by Robert Rosenberg, Murray Hill Books, New York, $5.00.

One of the most unusual technical books we've seen in a long time. The 308 pages of reading matter, minus illustrations, are spiral-bound along the *right* hand edge; all the illustrations are in a separate 242 page section, spiral-bound along the *left* hand edge, as shown in top photo. The two sections have a common outside cover. The big advantage of this arrangement is that the drawings to which reference is made in the text are always in view (lower photo) and the reader finds it possible to follow detailed explanations without having to shuffle back and forth. The contents themselves represent a gold-mine of useful information for electrical repairmen.

MEN! Whether You're 16 or up to 40.. *Learn* ELECTRICITY

A partial view of one of the Training Departments at Coyne

Get Ready quickly for the Field that offers

STEADY WORK and A REAL FUTURE!

FREE BOOK shows how you can prepare for a GOOD JOB NOW

"LEARN-BY-DOING" IN COYNE SHOPS

Start now to prepare for a Lifetime of Success. Get into Electricity, the essential field that will continue to offer good pay and a real future all through the years. Coyne trains you, NOT by correspondence, but by actual shop work right here in the Coyne Shops in Chicago on real electrical machinery. You get necessary theory in a practical way by lectures, blackboard illustrations and equipment demonstrations.

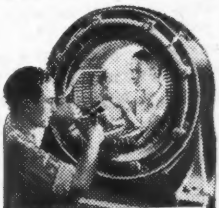
In the Big **Coyne** Shops you get **practical "all-around" training . . .** wiring, installing, operating, testing, repairing and servicing various types of Electrical and Electronic equipment . . . you work on real armatures, motors, generators, refrigerators, electronic controls, etc. No advanced education or previous electrical experience needed. Many of our students had no previous experience. **Others had experience in one or two branches but realized they needed all-around training for the better jobs and advancement.**

Student Finance Plan

Don't let lack of money hold you back. Our "Pay-Tuition-after-Graduation" plan has helped thousands. Coupon brings details.

Earn While Learning

Many earn while learning, to help take care of living expenses while here. When you have graduated, our Employment Department will give you Lifetime Employment Service.



PREPARE FOR PERMANENT JOBS LIKE THESE
Light and Power Wiring
Power Plant Work
Armature Winding
Substation Operator
Maintenance Electrician
Electrical Testing and Repair
Signal Maintenance
Industrial Electronics
Electric Refrigeration and many others
Our Employment Bureau for graduates gives FREE lifetime employment service.

Industrial Electronics and Electric Refrigeration Training Now Included

Added training in these two great fields is now included with our Electrical Course. Industrial Electronics and Electric Refrigeration offer big opportunities. Get BOTH at Coyne!

B. W. Cooke

MEN WITH PHYSICAL DISABILITIES—

We also have facilities for men with physical disabilities whether due to war or other causes Check coupon for particulars if you have a physical disability of any nature.

GET THE FACTS

Don't let lack of money keep you from sending in the Coupon now. Our Big FREE Book is full of facts and photographs which tell you about **Coyne** training. It also gives you the details of our **"Student Finance" Plan, Part Time Employment Plan, Graduate Employment Service, Lifetime Membership, etc.**

OUR GRADUATE EMPLOYMENT SERVICE HAS LETTERS FROM DOZENS OF FIRMS ASKING FOR COYNE TRAINED MEN FOR GOOD JOBS WITH A REAL FUTURE.

This modern fireproof building is occupied entirely by the Coyne Electrical School.

VETERANS

Coyne is also equipped to train those who qualify for training under the G. I. Bill of Rights. Check coupon for special G.I. Bulletin

ADDED TRAINING IN INDUSTRIAL ELECTRONICS AND ELECTRIC REFRIGERATION Now Included!

Send Today for this FREE Book!

B. W. COOKE, Director
COYNE ELECTRICAL SCHOOL,
500 S. Paulina St., Dept. 27-53, Chicago 12, Ill.

Without obligation send big free illustrated book with facts about **Coyne** and details of "Student Finance" Plan and added training in Industrial Electronics and Electrical Refrigeration you are now including.

☐ Send special G. I. Bulletin.
☐ Send physical disability details.

Name.....
Address.....
City.....*State*.....

B. W. COOKE, Director

COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Dept.27-53, Chicago,12

Mr. Kraus has been giving advice to inventors for more than 20 years. He will attempt to answer as many letters from inventors as possible in his column each month. Mr. Kraus will "call his shots as he sees them" in this column. Thoroughly versed in inventions and inventions procedure, he will never, under any circumstances, disclose any valuable secrets. He cannot answer questions relating to patent law. For such information, the Editors suggest you communicate with any one of the patent attorneys who advertise in MECHANIX ILLUSTRATED.

Poison Bottle

Bessie E. Johnson of Lexington, Ky., sends a photo print of a design for a poison bottle. She believes such a bottle will prevent mistaking the poison bottle for other bottles in the medicine cabinet.

ANSWER: *Many hundreds of designs for poison bottles have been developed. Some of these have projections; some are in coffin shape. Although all of these bottles serve a purpose, they do not prevent accidentally mistaking the contents. When a person is only half awake it requires more than the shape of a bottle or neck projections to bring him back to full consciousness. Aside from this, the projections in your design are very likely to break off and cause severe injury to the person handling the bottle.*

The best construction for such bottles which we have seen so far is the one requiring expert manipulation of the stopper of the bottle before its contents can be exposed. We would advise against wasting further time, money and energy on the present design.

Flashlight Holder For Guns

J. P. Frazier of Brownsville, Tenn., submits a design for a simple holder with which to attach a flashlight to a rifle or shotgun. This is intended for use in night hunting.

ANSWER: *There are many much better styles which have been developed. Perhaps the best of these is a unit which gives a pencil-like beam with a bull's eye at the center. When this is mounted on a rifle or pistol the bullet hits the center of the bull's eye. Of course, for long range shooting, corrections must be made for trajectory.*

However, your design is simple to construct. If made generally available it might meet with a limited sale. We would therefore recommend that you have a patent search made to determine if the item could be protected and that you investigate the manufacturing possibilities. A better hinged joint and a slotted opening for the fastening bolt would permit you to remove this holder from the rifle rapidly or to put it in position again. When not in use, this unit then could be strapped to the trouser belt quickly. These improvements are well within your ability and would offer greater sales possibilities.

Car Vacuum Cleaner

Peter Altrui, Patchogue, N. Y., states that he has a design for a vacuum cleaner which could be connected to the car and would serve for cleaning the upholstery.

ANSWER: *You have not submitted details of your design, consequently this reply cannot be too specific.*

Hand style vacuum cleaners are on the market today. The mere fact that you intend to operate one from a car battery instead of from the 110-volt circuits is not a satisfactory reason, in our opinion, for wanting to apply for a patent on such a design. We would not recommend further action on the basis of information at hand.

Self-Sealing Toothpaste Cap

Larry V. Fennell of Independence, Kans., sends a design for a toothpaste tube seal and asks for our opinion.

ANSWER: *This is another of those shearing closures which, in our opinion, are no good at all.*

In any type of closure for paste tubes, the device should have the cap clean after it closes the orifice. The conventional siding or rotating shearing devices do not do this. Some paste always is left behind. This paste hardens, accumulates dirt, and is generally unsightly. We recommend you forget it.

Toys

F. M. Sterling of Knoxville, Tenn., asks several questions concerning toys which he has designed.

ANSWER: *We think that both your airplane toy and your helicopter are very much worthwhile and would suggest that you have a patent search made on both items. This expression is based on your inference that you have built models of both toys and that they operate as described.*

We question your statement that the toys can be made to sell at the prices you list. Your 25-cent item must be manufactured completely for

[Continued on page 30]

WHICH OF THESE *Opportunities* INTERESTS *You* MOST?

Accounting
Air Conditioning
Architecture & Building
Automotive Engineering
Aviation—Practical
Aviation Drafting & Design
Better Foremanship
Bookkeeping
Business Management
Contracting
Diesel Engineering
Drafting & Design
Electrical Engineering
Electricity—Practical
Electronics, Industrial
High School Courses
Machine Shop Operations
Mechanical Engineering
Plastics Engineering
Plumbing—Practical
Private Secretary
Radio Operating & Servicing
Railway Training
Refrigeration
Sheet Metal Pattern Drafting
Shop Management
Tool Making

THINK! LOOK FORWARD!

Business is making big, new plans
Men and Women are preparing for the future
WHAT ARE YOU DOING ABOUT *YOUR* TOMORROWS?

● *Today,* choose the job you want—and prepare for it. Or if you are already engaged in the work you like best, start training *now* for quicker promotion. Acquire the knowledge that will help you to get ahead faster, make more money and have greater security.

Invest part of your spare time in more rapid progress. Start training now, in spare time in your own home. Be ready to grasp your opportunity and step out ahead of those who lack the ability you have attained.

American School, founded in 1897 as an educational institution *not for profit,* can help you to reach your goal just as it has helped others during the past fifty years. Give serious thought to the list above. Pick one or more subjects that interest you. Then check the coupon at right, add your name and address and mail it at once. The school will send you details on its training plan and outline of study prepared by specialists. There is no charge, no obligation, so send the coupon immediately.

AMERICAN SCHOOL

Dept. G-228, Drexel at 58th Street, Chicago 37

PRACTICAL, EFFECTIVE HOME-STUDY TRAINING SINCE 1897

Take This First Easy Step

CHECK, CLIP AND MAIL COUPON NOW

AMERICAN SCHOOL, Dept. G-228, Drexel at 58th, Chicago 37, Ill.
Without obligation, Please send FREE and postpaid, bulletin and details of the Subjects checked.

- ☐ PLASTICS ENG'R
- ☐ Refrigeration
- ☐ Architecture and Building
- ☐ Contracting
- ☐ Practical Plumbing
- ☐ Automotive Engr.
- ☐ Aviation Drafting
- ☐ Aviation
- ☐ Business Mgnment
- ☐ Railway Training
- ☐ Accounting
- ☐ Electrical Engr.
- ☐ Electricity—Pract.
- ☐ Electronics, Industrial
- ☐ Bookkeeping
- ☐ Private Secretary
- ☐ Diesel Engineering
- ☐ Sheet Metal Pattern Drafting
- ☐ Drafting and Design for Men and Women
- ☐ Radio
- ☐ High School
- ☐ Air Conditioning
- ☐ Mechanical Eng.
- ☐ Shop Management
- ☐ Tool Making
- ☐ Better Foremanship
- ☐ Machine Shop Operations

Name..... *Occupation*.....
Address..... *Age*.....
City..... *State*.....

$2000

of Old Line Legal Reserve

LIFE INSURANCE

(at age 21) ONLY $1.78 A MONTH*

Other ages in proportion

*One Half Permanent Rate in effect 5th year

Buy as little as $1500. of this solid protection —or more—at proportionately low rates. *But buy your Postal Policy now!*

Postal Life of New York has specialized for 40 years in insurance by mail and over the counter. The savings due to this direct dealing are passed on to policy holders. Current dividends 9½%. Further savings are made if premiums are paid quarterly, semi-annually or annually.

POSTAL LIFE OF NEW YORK

operates under the rigid New York State Insurance Laws and has paid out over

$55,000,000.00

to its Policy Holders and Beneficiaries.

Postal issues all Standard Policies to men or women, from ages 10-60, at low cost.

Send coupon today for rates on this Modified "4" Policy at your age and other details. *Life Insurance is vital!*

CLIP AND MAIL COUPON TODAY

POSTAL LIFE INSURANCE COMPANY
511 Fifth Ave., Dept. M-666
New York 17, N. Y.

Mail me without obligation complete information about your low-cost Modified "4" Policy at my age.

Name .....

Date of Birth .....

Occupation .....

Address .....
(Street and No., Zone, City and State)

CAUGHT BY THEIR FINGER PRINTS

YOU— Can Become a CRIMINAL INVESTIGATION and FINGER PRINT EXPERT AT HOME!

During the past 30 years the I. A. S. has trained hundreds of men at home to fill positions of responsibility and steady pay as finger print experts. This fascinating, profitable profession can be learned at home during spare time. More than 800 *American Identification Bureaus* employ I. A. S. graduates or students. Write today for complete list of these Bureaus.

Send Now for "BLUE BOOK of CRIME"
Thrilling, inspiring, helpful. Be sure to state your age when sending for book. **FREE!**

INSTITUTE OF APPLIED SCIENCE
Dept. 2352, 1920 Sunnyside Ave., Chicago 40, Ill.

MAKE MONEY AT HOME

RUBBER MOLDS *Low as* 6¢ EA.

Amazing rubber mold-making outfit makes perfect flexible molds of plaques, ash trays, book-ends, etc. Molds cost 6c to 25c each. Each mold makes hundreds of novelties and gifts to sell for $1.00 apiece and more! No experience necessary. Everything furnished. Quick and easy. Start profitable business in your home—sell to stores, gift shops, friends, resorts, road stands, by mail. Full or spare time. Write for complete FREE details and easy instructions.

SO-LO WORKS, INC., P-802, Loveland, Ohio

START NOW TOWARD A FUTURE IN *REFRIGERATION and AIR CONDITIONING*

Refrigeration and Air Conditioning are among the giant Industries of America. Such industries need men who KNOW. Many men servicing and installing equipment are making large incomes.

Spare Time Training

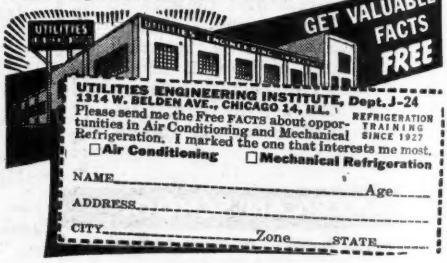
If mechanically inclined, get the training you need to qualify for experience installing & servicing Refrigeration and Air Conditioning in stores, offices, homes.

Then you should have no difficulty getting started in these great industries. As experience, tools and a personal following are acquired; you may find it practical, later, to start your own REFRIGERATION and AIR CONDITIONING SHOP.

Approved for Training under G.I. Bill

Practical Interesting Training

You'll like our way of training—through capable home-study instruction followed by practice on actual equipment under watchful eyes of seasoned Refrigeration and Air Conditioning men in our shops. You'll get top-rate instructions—the easy way. So **get the facts now—FREE** of obligation. Write TODAY—SURE!



UTILITIES ENGINEERING INSTITUTE, Dept. J-24
1314 W. BELDEN AVE., CHICAGO 14, ILL.
REFRIGERATION TRAINING SINCE 1927

Please send me the Free FACTS about opportunities in Air Conditioning and Mechanical Refrigeration. I marked the one that interests me most.

☐ **Air Conditioning** ☐ **Mechanical Refrigeration**

NAME_____ Age_____

ADDRESS_____

CITY_____ Zone_____ STATE_____

GET INTO RADIO ELECTRONICS & TELEVISION for Success and Security!

SHOP METHOD HOME TRAINING BY A REAL ESTABLISHED RESIDENT SCHOOL

In the Classrooms, Shops and Laboratories of this Established School, **improved training methods** have been designed for practical Home Study instruction in the great field of Radio—in the rapidly expanding branches of Television and Electronics. National graduates everywhere have qualified, through spare time study, for well-paying jobs, success and security. Here is training created BY Practical men FOR Practical men.

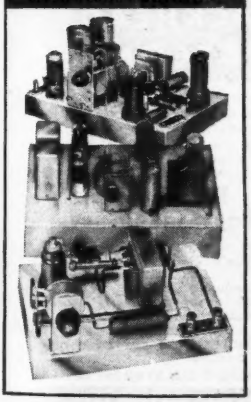
You build this powerful superheterodyne receiver.

are constantly absorbing trained men. If you like mechanics—like to work with your hands as well as your head, you too can find your opportunity in industry or in a business of your own.

LEARN BY DOING RIGHT AT HOME

The secret of success of this practical training method is the EXPERIENCE OF WORKING WITH ACTUAL FULL SIZE, STANDARD EQUIPMENT DURING YOUR TRAINING. Here's a fully tested and approved method—thorough, complete and easy to put into PRACTICE! As you go along, you check PROGRESS right on your own equipment! You can see advancement from the start. It will only take a moment to fill out and send the coupon for a sample lesson. PROVE TO YOURSELF HOW MUCH YOU CAN ACCOMPLISH WITH NATIONAL TRAINING SHOP METHODS.

BIG KITS OF EXPERIMENTAL EQUIPMENT ARE INCLUDED WITH YOUR TRAINING



Here are a few of the units of Standard Radio equipment supplied. Build a big, long distance receiver, an audio oscillator, a signal generator and conduct many other experiments.

BECOME A RADIO EXPERT IN YOUR SPARE TIME

The Radio, Television and Electronics industries are demanding more and more trained, experienced men as service men, operators and technicians. It is a field with a proved future. Untold Radio sets are in use—they need maintenance or repair. **Radio service organizations, broadcasting, marine and police Radio, public address, and other specialized phases**

BIG OPPORTUNITY BOOK AND SAMPLE LESSON Free

Learn how National trains you for good-paying jobs—a business of your own. Get this valuable "Modern Radio Servicing" manual without obligation. Send coupon NOW!

VETERANS

If you qualify for training under G. I. Bill, check the coupon for a Special Bulletin.

NATIONAL SCHOOLS

LOS ANGELES 37, CALIFORNIA EST. 1905

MAIL OPPORTUNITY COUPON FOR QUICK ACTION

National Schools, Dept. 2-MI
4000 South Figueroa Street
Los Angeles 37, California

(Mail in envelope or paste on penny post card.)

Mail me FREE the books mentioned in your ad including a sample lesson of your course. I understand no salesman will call on me.

NAME..... AGE.....

ADDRESS .....

CITY..... ZONE.... STATE.....

☐ **Check here if veteran of World War II**

NEW! FOR BEGINNERS Learn ELECTRIC MOTOR REPAIR!

580 pages
900 illustrations and diagrams

SHOWS YOU HOW EVERY STEP OF THE WAY!

Learn Easily, Quickly, at home for only $5

Every day, more and more electric motors are being used BOTH in industry and in home appliances. The motor repair expert is a valuable man in this Electrical Age! ELECTRIC MOTOR REPAIR, the big new book for only $5, teaches all about this fascinating work—quickly and easily in your spare time. Explains every detail of motor trouble diagnosing, repair and rewinding.

TRAIN FOR GOOD PAY IN AN UNCROWDED FIELD!

Covers alternating—and direct-current motors, synchronous motors and generators and BOTH mechanical and electronic motor control systems. Quick-reference guides at end of every chapter show exactly how to handle specific jobs. Invaluable for either beginners who want to learn HOW—or for actual bench use in busy repair shops.

There's Big Money In the Work. The Field Is Not Overcrowded!

Based on what you can learn at home from this big book, you can train yourself for prompt and PROFITABLE service on practically any motor. Every step of the work is demonstrated VISUALLY by more than 900 easily-understood diagrams. These are indexed for quick on-the-job reference. The unique Duo-Spiral Binding divides book into 2 sections permitting BOTH text and related illustration to be seen AT THE SAME TIME. Lies open flat on bench while you work!

Unique Duo-Spiral Binding

FREE! Check coupon for free literature on famous **GHIRARDI RADIO-ELECTRONIC Training Books**

"BORROW" IT FOR 5 DAYS

Send coupon now. Practice from ELECTRIC MOTOR REPAIR for 5 full days. If not more than satisfied with the book, return it to us. Every cent of your money will be cheerfully refunded—and no questions asked. What could be fairer? You be the judge!

5-DAY MONEY-BACK GUARANTEE

Dept. MI-27, Murray Hill Books, Inc.
232 Madison Ave., New York 16, N. Y.

☐ Enclosed find $5 ($5.50 foreign) for my copy of the big ELECTRIC MOTOR REPAIR book; or ☐ send C.O.D. (in U.S.A. only) for this amount plus postage. In either event, if unsatisfactory for any reason, I may return book in 5 days and have my money refunded.

☐ CHECK HERE for free literature on Ghirardi RADIO-ELECTRONIC books.

Name _____

Address _____

City & Dist. No._____State_____

SHORTHAND IN 6 WEEKS

LEARN AT HOME—LOW COST

Write 120 words per minute. Easy for adults.

Famous Speedwriting system. No signs or symbols; uses ABC's. Easy to learn and use. Fast preparation for a position. Nationally used in leading offices and Civil Service; also by executives, writers, speakers, lawyers, scientists, students at college. Over 100,000 taught by mail. The very low cost will surprise you. 24th Year.

WRITE FOR FREE BOOKLET TO

Speedwriting
(Trade Mark Reg., U.S. Pat. Off.)
Dept. 1702-7, 55 W. 42 St., N. Y. 18.

MAKE YOUR OWN COSTUME JEWELRY

SPLENDID HOBBY OR VOCATION

Sea Shells • Pin Backs • Ear Screws • Screw Eyes
Plastic Discs • Ear Clips • Floral Stones • Jump Rings
Chains • Clasps • Wire • Boxes • Bracelets • Parts
Bow Knots • Catches • Plexiglas • Cements • Dyes

WRITE FOR FREE CATALOGUE • DEPT. C

PHILADELPHIA BADGE CO. 1004 Filbert St., Phila 7, Pa

FUN WITH AMAZING NEW MAGIC DICE

Here's a special pair of fun dice that can do anything you want them to. It's amazingly easy to predict numbers, perform amusing tricks. No one can guess the hidden "secret" unless you tell them! Display amazing "control," yet the real reason is cleverly concealed from everyone. Fun and fascination! Easy directions explain details. Perform many "magic" tricks! Price only $2.98. Get a pair today. Send no money. Just name and address. On arrival, pay postman only $2.98 plus postage. Money back if not delighted. Address HOLLISTER-WHITE CO., Dept. 440-D, 215 N. Michigan Ave., Chicago 1, Ill.

Ugly BLACKHEADS OUT IN SECONDS

$1.00

Keep your complexion free of Blackheads this new way — look attractive instantly!

Try VACUTEX Blackhead-Remover

The amazingly effective Vacutex extracts Blackheads automatically—WITHOUT squeezing the skin or injuring tissues. Easy to use with three fingers. It reaches Blackheads anywhere. Try it 10 days and if not delighted return VACUTEX and your money will be refunded.

AT YOUR DEALER OR USE COUPON

10 DAY TRIAL COUPON

BALLCO PRODUCTS CO., Dept. A-9702
19 West 44th St., New York 18, N. Y.

☐ Enclosed find $1. Send postpaid.
☐ Send C.O.D. I will pay postman $1 plus postage; $1 refund if not delighted.

SORRY, NO C. O. D.'s OUTSIDE U. S. A.

WAR BARGAINS in LENSES and PRISMS

ASSEMBLE YOUR OWN BINOCULARS!

COMPLETE OPTICS! COMPLETE METAL PARTS!

(Delivery on Binocular Sets Beginning January 30th)

SAVE MORE THAN ½ REGULAR COST

ARMY'S 7x50 BINOCULARS

Here's an unusual opportunity to secure a fine set of Binoculars at a substantial saving of money. Offered here are complete sets of Optics and Metal Parts for the Army's M-16 7 X 50 Binoculars (M-16 is not the waterproof model). These components are new and all ready for assembly. We supply full instructions. Limit—1 set of Metal Parts and 1 set of Optics to a customer.

METAL PARTS—Set includes all Metal Parts—completely finished—for assembly of 7 X 50 Binoculars. No machining required. Bodies have been factory hinged and covered. A sturdy brown leather Binocular Carrying Case is included with each set of Metal Parts.
Stock #824-B . . . 7 X 50 Metal Parts .....$35.00 Postpaid

OPTICS—Set includes all Lenses and Prisms you need for assembling 7 X 50 Binoculars. These Optics are in excellent condition—perfect or near perfect—and have new low reflection coating.
Stock #5102-B . . . 7 X 50 Optics .....$25.00 Postpaid

NOTICE! If you buy both the Binocular Optics and the Binocular Metal Parts, your purchase becomes subject to 20% Federal Excise Tax. Be sure to add amount covering tax to your remittance or your order cannot be filled.

ARMY'S 6x30 BINOCULARS

No Carrying Case with any Sets shown below. (None yet available in Surplus Market.) M-13A1 sets are waterproof model. M-3 sets are not waterproof. Limit—1 Set to a Customer on all Sets shown below.

COMPLETE OPTICS & METAL PARTS—Model M-13A1, 6 X 30 Binoculars. Everything you need—ready for assembly. When finished will look like a regular factory job costing $102 to $120. The Optics are new, in perfect or near-perfect condition. Have new low reflection coating. Metal Parts are new and perfect, all completely finished. No machining required. Bodies factory hinged and covered. Complete assembly instructions included.
Stock #830-B .....$40.00 Postpaid, plus $8.00 tax—Total—$48.00

COMPLETE OPTICS & METAL PARTS—Model M-3, 6 X 30 Binoculars. The Optics in this set are new, perfect or near-perfect. Prisms have new low reflection coating. Factory mounted Eye Piece and Objective Assemblies not coated. Metal Parts are perfect, new, ready for assembly. When finished, this will look like a regular factory job, except a name has been filed off a cover plate. No machining required. Bodies factory hinged and covered.
Stock #831-B .....$35.00 Postpaid, plus $7.00 tax—Total—$42.00

METAL PARTS ONLY—Model M-13A1, 6 X 30 Binoculars. No Optics. Same Metal Parts as described for Stock #830-B.
Stock #832-B . . . 6 X 30 Metal Parts .....$25.00 Postpaid

METAL PARTS ONLY—Model M-3, 6 X 30 Binoculars. No Optics. Some machining on these Metal Parts required. Bodies hinged and Prism Shelf holes placed, but you must tap them. Prism Shelves have been machined. Six lead spiral focusing threads have been cut. Some less difficult components you must thread and machine yourself, but all material you need is furnished except body covering material and Optics.
Stock #833-B . . . 6 X 30 Metal Parts .....$12.00 Postpaid

METAL PARTS ONLY—Model M-3, 6 X 30 Binoculars. No Optics. All parts you need. You must do machining on most parts, but not all. No body covering material.
Stock #834-B . . . 6 X 30 Metal Parts .....$8.00 Postpaid

OPTICS FOR 6 X 30 BINOCULARS. (No Metal Parts.) Slight seconds. Cemented but not coated.
Stock #5123-B .....$10.00 Postpaid

SAME OPTICS AS ABOVE (6 X 30), but coated.
Stock #5124-B .....$12.75 Postpaid

If you buy both the Binocular Optics and the Binocular Metal Parts, your purchase becomes subject to 20% Federal Excise Tax. Be sure to add amount covering tax to your remittance or your order cannot be filled.

Optics and Metal Parts are Available for Monoculars (½ a Binocular). For Complete Details, Write for Bulletin #14-B.

YOU CAN EASILY MAKE

Telescopes, Magnifiers, Photographic Gadgets and Hundreds of Experiments with these Low Cost Lenses.

MOUNTED 35 MM PROJECTING LENS SYSTEM (May Also Be Used for Enlarging). Focal Length 91.44 mm and speed of f 1.9. Outside dia. of mount at one end 60 mm. Length of mount 64 mm. May be used as Enlarging Lens by stopping down speed. Most useful for Portrait work. Less useful for pictures requiring perfect definition out to edges of print.
Stock #4033-B .....$3.00 Postpaid

CONDENSING LENSES for 35 mm Projectors and Enlargers. Consists of set of 2 Lenses—diam. 2⅝", F.L. 3" each.
Stock #1077-B .....$2.00 Postpaid

MOUNTED KELLNER TELESCOPE EYE PIECE—Perfect, coated, in Ordnance sealed boxes. F.L. 1¾ inches. Outside dia. of steel mount 40 mm.
Stock #6198-B .....$3.15 Postpaid

OPTICAL BENCH KIT—(Not a War Surplus Item) Everything you need, including four Lens Holders for checking Focal Lengths and setting up Lens Systems.
Stock #53-B .....$8.50 Postpaid

35MM KODACHROME PROJECTING LENS SET—Consists of 2 Achromatic Lenses for projecting, plus 2 Condensing Lenses and piece of Heat Absorbing Glass with directions.
Stock #4029-B .....$3.10 Postpaid

POLARIZING VARIABLE DENSITY ATTACHMENT FOR 7 X 50 BINOCULARS—An amazingly effective unit for controlling amount of light reaching your eyes. Cuts down glare in sky and overwater observations. Easily snapped on and off over the eye cups of American-made 7 X 50 Binoculars. Govt. cost $8.30 each.
Stock #20,000-B .....$2.00 Postpaid

PRISM TELESCOPE—All the Lenses You Need to Build your own 20 power Telescope! No mounts. Has wide field of view.
Stock #5012-B .....$7.25 Postpaid

GIANT SIZE RED AND AMBER FILTERS

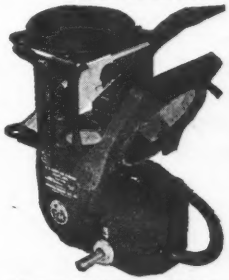
Filter material is cemented between glass. All ⅜" thick.

Stock #	Color	Diam.	Price
706-B	Red	7-⅞"	$2.00
707-B	Red	5-⅞"	1.50
708-B	Amber	7-⅞"	1.50
709-B	Amber	5-⅞"	1.00

USES: For large camera filters, for large size spotlights, for darkroom lights (spectroscopically tested), for interior decorating, for display tray in home or store.

AIR FORCES GUN SIGHT

With Polarizing Variable Density Attachment



Can be used as Slide Viewer, or take it apart and you can get Polarizing Variable Density Attachment, Mangin Concave Mirror, Reflector Plate, Metal Reticle, Window, Lamp Housing, Ring and Bead Sight. The Polarizing attachment alone is worth many times the price of entire unit. Consists of 2 Polarizing Filters mounted with small handle which rotates one around the other. May be used in Photography, Research, Experiments, as Light Dimmer, etc.
Stock #908-B ...$5.00 Postpaid

Same Unit Without Polarizing Attachment
Stock #916-B ...$2.50 Postpaid

BOMBER SIGHTING STATION—A double end Periscope Type Instrument of highest precision. 6 ft. tall, shipping wt. 360 lbs. Orig. cost $9,850. Consists of numerous Lenses, Prisms, Mirrors, Gears, Motors, Metal Parts and Electrical Gadgets.
Stock #914-B .....$50 F.O.B. Oklahoma

TANK PRISMS—90-45-45 deg., 5¾" long, 2½" wide, finely ground and polished.
Stock #3004-B Silvered Prism (new & perfect) .....$2.00 Postpaid
Stock #3005-B Plain Prism (new & perfect) .....$2.00 Postpaid
Stock #3100-B Silvered Prism (Second) .....$1.00 Postpaid
Stock #3101-B Plain Prism (Second) .....$1.00 Postpaid

We have literally millions of war surplus lenses and prisms for sale at bargain prices. Write for Catalog "B"—Sent Free!

SATISFACTION GUARANTEED • ORDER BY STOCK No.

EDMUND SALVAGE CO., P.O. Audubon, New Jersey

BE A CLERK *all my life?* NOT ME!!

Of course you say you won't.

But you may be unless you do something about it.

Hoping and wishing won't get you a better job and more money.

You must prepare for that step ahead—be ready to make promotion come.

We have helped thousands of ambitious men and women get ahead in the business world—perhaps we can help you.

At least you should investigate. It may be the turning point in your life to a better job and more money. So send the coupon without delay. Check the field of your choice and we'll send you without obligation the requirements and opportunities in that field.

G. I. APPROVED.

LASALLE Extension University

A Correspondence Institution

417 S. Dearborn St., Dept. 2493-R, Chicago 5, Ill.

I want to know whether you can help me get ahead in the field I have checked below. Send me your free 48-page booklet and full information about your home-study training in that field.

- ☐ Accounting
- ☐ Bookkeeping
- ☐ C.P.A. Coaching
- ☐ Law: LL.B degree
- ☐ Salesmanship
- ☐ Stenotypy (Machine Shorthand)
- ☐ Business English
- ☐ Effective Speaking
- ☐ Industrial Management
- ☐ Executive Management
- ☐ Traffic Management
- ☐ Foremanship

*Name*_____ *Age*_____

*Position*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

CONFIDENTIAL LOAN SERVICE

Borrow $50 to $300.00 BY MAIL

Need money? No matter where you live you can borrow **BY MAIL** $50.00 to $300.00 this easy quick *confidential* way.

IT IS EASY TO BORROW BY MAIL! Completely confidential and private. CONVENIENT MONTHLY PAYMENTS

NO ENDORSERS NEEDED

EMPLOYED MEN and women of good character can solve their money problems quickly and in privacy with loans **MADE BY MAIL.** No endorsers or co-signers. We do not contact employers, friends or relatives. Convenient monthly payments. Send us your name and address and we will mail application blank and complete details FREE in plain envelope. There is no obligation.

STATE FINANCE CO.

Southern Surety Bldg., Dept. G-97, Des Moines 8, Ia.

WELDING

Offers Outstanding Opportunities

for steady income or a business of your own. Properly trained Technicians in Arc and Gas Welding are in great demand everywhere. Learn by doing in 6 months. Write for FREE 64 page illustrated book—"Dawn of a Giant Industry."

MILWAUKEE SCHOOL OF ENGINEERING

MI-247A Broadway and E. State, Milwaukee, Wis.

Quality Kitchen Fluorescents **$4.50**

Plugs right into your fixture. U/L app. parts. Uses 2-15 or 2-20 watt lamps. Specify size. Lamps 80c each. AC or DC. Order Now.

PHONO AMPLIFIER—3 tube AC-DC Vol and Tone controls wired_____$3.25

PHONO AMP. KIT—Complete with 3 tubes and 5" spk.___$7.95

Wired, 50c extra—less tubes or spk.___$5.95

Uses—12SQ7, 50L6, 35Z5.

Detrola Record Changers _____$17.00

25% on C.O.D. orders—FREE CATALOG B

WHOLESALE RADIO DISTRIBUTORS

Risco Sales Co. 414 2nd Ave. at 23rd St. N. Y. 10, N. Y.

BUILDING

FREE SAMPLE LESSON

Millions of homes needed. Nation wide call for builders. Big opportunities. Learn now in spare time, — at home. Practical training with blue prints. No books. Send for FREE Trial Lesson and blue print plans.

CHICAGO TECHNICAL COLLEGE

B-168, Tech. Bldg., 2000 S. Mich. Ave. Chicago 16, Ill.

BOYS • GIRLS

Enjoy this Great

HOBBY!

COLLECT GENUINE U. S. MILITARY

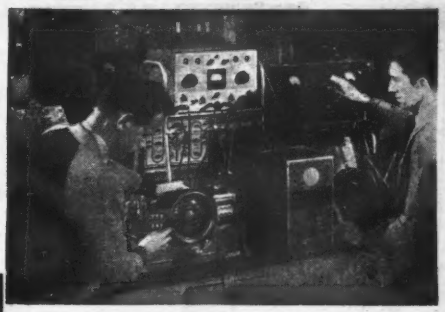
Shoulder Patches

Here is the real thing. Over 300 designs of authentic military shoulder patches in stock from 15c to 50c. Send only 10c in coin for illustrated folder and price list. Watch your hobby *GROW!*

P. O. Box 1092, Dept 1-2, Omaha, Nebr.

MIDWEST SALES CO.

Learn RADIO-ELECTRONICS-TELEVISION



RADIO TESTING AND SERVICING—Students learning to locate troubles with modern radio analyzers.

ELECTRONIC CIRCUIT TESTING — Instructor showing students use of large Cathode Ray Oscilloscope.

TRAIN FOR A GOOD JOB NOW *one that offers* STEADY WORK *with a* REAL FUTURE

Don't be caught napping. Prepare for a good job now that will still be a good job with a real future when conditions change. If you are not a trained man you may have to compete with millions of other untrained men. Get into a field that offers real opportunities in good-times and bad-times. Tremendous expansion in Frequency Modulation and Television is predicted because of war time discoveries now being re-converted to civilian use. Radio-Electronics trained men are needed today—they will be needed in the years ahead!

"Learn by Doing"

RIGHT HERE in the SHOPS of COYNE—in a Few Weeks

Student Finance Plan

We train you on real Radio, Television and Sound equipment—RIGHT HERE IN THE COYNE SHOPS IN CHICAGO. Necessary theory is given in a practical way by practical lectures, blackboard illustrations and equipment demonstrations. **Whether or not you have had Radio experience you need Coyne all-around Radio Electronics training.** Many of our students had no previous experience. Others had experience in one or two branches but **realized they needed all-around training for better jobs and advancement.**

EARN WHILE LEARNING

If you need part-time work to help pay living expenses while at school, we will help you get it. **Coyne** graduates also receive a **Life Membership** with **Lifetime Employment Service.**

MEN WITH PHYSICAL DISABILITIES—whether due to war or other causes—we also have facilities for you. **Check coupon for particulars if you have a physical disability of any nature.**

PREPARE FOR JOBS LIKE THESE

Radio Servicing
Radio Sales
Radio Manufacturing
Factory Inspecting and Testing
Auto Radio Installation & Servicing
Sound and Public Address, etc.
Your Own Radio Shop

Electric Refrigeration Now Included

ADDED TRAINING This training included to help you get ready for the better jobs in this great field

Real Opportunities for the Radio Trained Man

Prepare for jobs as assembler, inspector and tester—Radio sales or service and installation work, electronics, television, sound work, aircraft-radio, auto-radio, etc. Many opportunities in the vast **Radio-Electronics** field.

GET OUR BIG NEW BOOK

It tells all about our big Chicago shops and our plans to help you get ahead. Packed with facts and pictures of students at work in our shops. **Mail coupon for this Big New Book now!** Coupon will also bring details on how we'll **finance most of your tuition**...facts on how we help you "Earn-While-Learning"...information on FREE EMPLOYMENT SERVICE FOR LIFE...and other plans to help you. ACT NOW TO MAKE SURE YOU GET OUR GENEROUS OFFER. Sending for this interesting free book can be **your first big step to success. No obligation. No salesman will call. Mail coupon today.**

B. W. Cooke

THE HOME OF COYNE

VETERANS! Coyne is also equipped to train those who qualify for training under the G. I. Bill of Rights. Check coupon for special G. I. Bulletin.

B.W.COOKE, Dir., Radio-Electronics Div.,
COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Dept. 27-1H
Chicago 12, Ill.

Dear Mr. Cooke, Send me your Big Free Radio-Electronics Book and all the facts . . . also full details of your "Student Finance" plan. ☐ Send special G.I. Bulletin.
☐ Send physical disability details.

NAME.....

ADDRESS.....

CITY.....STATE.....

B. W. COOKE, Dir. Founded 1899

COYNE ELECTRICAL SCHOOL
RADIO-ELECTRONICS DIV.

500 So. Paulina Street Dept. 27-1H, CHICAGO 12, ILLINOIS

WAR SURPLUS BARGAINS

$500,000.00 INVENTORY for QUICK LIQUIDATION

U. S. Gov't. surplus and other items for home, shop, factory, farm and outdoors. New, used and reconditioned. Tremendous savings! All priced for quick sale.

HUNDREDS of ITEMS to CHOOSE FROM

RADIO HEAD-PHONES

Extremely sensitive with 4000 ohms resistance. Brand new and fully guaranteed. With moisture-proof cord and phone plug. A splendid value for the radio serviceman and experimenter.
A106—PAIR _____ **$2.95**
New supersensitive phones.
A108—Pair _____ **$5.95**

RAIN SUITS

New 2 piece rain suits. Of durable wear resisting water and wind repellent OD fabric. Bib style pants, zipper fly. Jacket has parka attached. Guaranteed 100% weatherproof. Small, medium and large sizes. Shp. wgt. 3 lbs.
No. R549. Ea. **$4.95**

WOOL SLEEPING BAG

G.I. type 100% wool with 90 inch Talon zipper. Used but renovated for reissue. Shp. wgt. 3 lbs. No. 165. Each__ **$3.95**

Wool Blanket

Full size and 100% wool. Used but renovated for reissue. Use for camping, etc.
Shp. wgt. 3 lbs.
No. 233—Each_____ **$4.89**

POPULAR RECORD ASSORTMENT

Fifty records of modern dance, race, blues and hillbilly selections. No two alike. Famous name bands and artists included. Used in juke boxes, but guar. perfect. Shipped exp. collect only—no exchanges or refunds. Wgt. 28 lbs.
No. A303—50 records_____ **$9.64**
No. A300—25 records. All Dance. Wgt. 14 lbs. **$4.88**
No. A301—25 Records, Hillbilly, Race and Blues. Wgt. 14 lbs. Set_____ **$4.88**
No. 302—25 Records. All Hillbilly numbers. Wgt. 14 lbs. Set _____ **$4.88**

PROF. TELEGRAPH KEY

Purchased from the gov't. Finest design and construction. Base measures 3x4¾ inches. Original value $2.50. All parts of instrument brass. Adjustable.
A-147. Each __ **98c**

7 LB. EXPERIMENTER PARTS ASSORT. KIT

A "gold mine" for the radio serviceman. Hundreds of valuable radio parts, new radar and electronic parts and subassemblies, coils, resistors, trimming condensers—worth many times this low price. A130R—7 lbs._____ **$1.76**

2 Man Mountain Tent

Regulation Army type two man mountain tent, complete with poles, guy ropes, etc. Of durable nylon with reinforced seams. Ideal for outdoorsmen, campers, etc. Shp. wgt. 10 lbs. A splendid value. Stock No. 202—Each _____ **$9.95**

BOMB PARACHUTE

Of white nylon 5x8 feet in diameter. Solit seam for directional dropping of bombs, emergency rations, etc. Each packed in a metal container. Material alone worth more than price quoted. Wgt. 6 lbs. No. 162. Each___ **$1.95**

HAND MICROPHONE

Top quality hand microphone with control button in handle. Highly sensitive. Has rubber covered cord and tel. plug. Fine for use on home recorders, public address systems, etc. Brand new—perfect. Shp. wgt. 2 lbs. Stock No. 170. Each___ **$1.95**

Make remittances by money order, bank draft or personal check. Send 25% deposit on C.O.D. No C.O.D.'s under $5.00, please. Include postage on parcel post orders. All prices F.O.B. Chicago. Satisfaction guaranteed or your money back. Catalog free on request.

FREE CATALOG

STARK'S Dept. MI-2 509 So. STATE STREET CHICAGO 5, ILLINOIS

SEND FOR THIS FREE!

Make money with horses. Every farmer, every lover of horseflesh should have a copy of this booklet. If you want to know how to break, train and make money with horses, *write today for full information FREE*, together with my special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse check here. ☐ *Do it today—now. You'll never regret it.*

BEERY SCHOOL OF HORSEMANSHIP
Dept. 1152-D Pleasant Hill, Ohio

LEARN WATCH REPAIRING

AT HOME

Construction, Repair, Adjustment. New complete **"PRACTICAL COURSE"** for beginners and professional repairmen. All essential steps. Theory, operation. Many test cases. Full coverage of tools, materials. Fully illustrated. Only postpaid if C.O.D. plus postage, C.O.D. fee. Money back guarantee. **$2.95**

WE SUPPLY TOOLS, MATERIALS AT LOWEST COST

Please request price quotation on specific items of interest. We carry complete sets of TOOLS and MATERIALS for Students and Practical Repairmen. Request folder.

MODERN TECHNICAL BOOK CO., Dept. MI
55 West 42nd St., New York 18, N. Y.

STUDY AT HOME

WITH AN EDUCATIONAL INSTITUTION

Courses in ENGINEERING: Electrical; Civil; Mechanical; Drafting; Architectural; Automotive; Steam; Diesel; Aeronautical; Radio; Structural; Mining; Industrial; Petroleum; Marine; Refrigeration; Air Conditioning; Chemical.
Courses in ARTS AND SCIENCES: Philosophy; Education; Letters; Psychology; Public Health; Medical Jurisprudence; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture.

McKinley-Roosevelt Incorporated 4610-CC, Sheridan Rd., Chicago 40, Illinois

IMPROVE YOUR PLAYING

PIANISTS—Send for FREE Booklet showing how you may greatly improve your technique, accuracy, memorizing, sightreading and playing thru Mental-Muscular Coordination. Quick results. Practice effort minimized. Used by famous pianists, organists, teachers and students. No obligation.

Broadwell Studies Dept. 147-B Covina, Calif.

NEW PLASTICS Fabricating MANUAL

Make beautiful objects of Plexiglas, Lucite, Catalin, Polystyrene at home. Jewelry, novelties, accessories. Send for new 10,000 word manual on how to fabricate, weld and form latest plastic materials in home workshop. Hundreds of practical suggestions. Written by leading plastics engineer. Price prepaid 25c (stamps or coin). Or get FREE information and price list covering transparent plastic sheets, rod, tubing cut to your size.

Also 4-Project Plastics Kit

Or start by getting new 4-Project Plastics Kit. Contains transparent Lucite Materials, cut to size, plus professional coloring outfit, dyes and cement to make four beautiful articles: paper knife, cigarette box and match holder, picture frame, candy dish. Kit also includes instructions to finish your articles in gorgeous colors to equal articles in gift shops at $20.00 to $25.00. Send $4.50 (check, money order) for Kit. Or you can order the Kit sent C.O.D. For Fabricating Manual and plastics price list only, send 25c, stamps or coin. **HOUSE BEAUTIFUL PLASTICS, Dept. B2, 5534 West Harrison St., Chicago 44, Ill.**

Now YOU Can Lick Any AUTO REPAIR JOB!

IN LESS TIME—WITH LESS WORK

FREE 7-DAY OFFER

USED BY U.S. ARMY

MoToR's New AUTO REPAIR MANUAL shows you how to service and repair ANY part of ANY car!

No auto repair job is too tough when you've got MoToR's AUTO REPAIR MANUAL! YOU can repair anything from carburetor to rear end—quickly, easily, right! Just look up make, model, and the job in the quick index—and go to work! Clear, illustrated instructions lead you step by step.

To make such an amazing book possible, the engineer-editors of MoToR Magazine collected and "broke down" 150 official factory *shop manuals* for you, spotted all the vital repair information you need, dove-tailed it all together into ONE handy, easy-to-understand book.

No Other Manual Like It!

This BIG book—764 pages, 8½x11 inches, bound in sturdy fabric—brings you nearly 200,000 service, repair, adjustment, replacement, tune-up facts on every car built from 1935 thru 1946. More than 1000 cut-away photos, diagrams, drawings show you exactly WHAT to do and HOW to do it! Used by the U. S. Army, trade and technical schools everywhere, thousands of auto servicemen.

Now YOU—*without cost*—can see for yourself what a wonderbook MoToR's Auto Repair Manual really is. TRY it—FREE for 7 days! Learn first-hand how it can *pay for itself* the first few times you use it.

SEND NO MONEY

7-Day Free Examination

Just mail coupon below—*without money*! When the postman brings your book, pay him nothing. First make it *show* you what it's got! Unless you agree this is the greatest time-saver and work-saver you've ever seen—return book in 7 days and pay nothing. Mail coupon today! Address: MoToR Book Department, Desk 3B, 572 Madison Ave., New York 22, New York.

Clear, Pictured Facts on Every Job on Every Car Built Since 1935!

Nearly 200,000 service and repair facts on all these makes:

American Bantam	Dodge	Nash
Auburn	Ford	Oldsmobile
Austin	Graham	Overland
Buick	Hudson	Packard
Cadillac	Hupmobile	Pierce Arrow
Chevrolet	Lafayette	Plymouth
Chrysler	La Salle	Pontiac
Cord	Lincoln	Reo
Crosley	Lincoln Zephyr	Studebaker
De Soto	Mercury	Terraplane
		Willys

764 big pages; including 50 pages of carburetor text, charts, illustrations, covering all models. Over 500 charts, tables; Tune-up Chart; Valve Measurements; Compression Pressure; Torque Wrench Reading; Starting Motor; Engine Clearances; Generator; Clutch & Brake Specifications; Front End Measurements, etc., Engines; Electric, Fuel, Cooling, Lubricating Systems; Transmissions; Universals; Front Ends; Wheels; Rear Ends, etc.

Same FREE 7-Day Offer Applies on

MoToR's TRUCK REPAIR MANUAL

For mechanics, truck specialists, service stations, fleet owners. Covers EVERY job on EVERY truck made since 1936! 1400 pictures, 914 pages, 300,000 facts. Used by Armed Forces. Warranted to contain every essential fact you need to know. Sturdy binding, size 8½x11.

Covers all types Gasoline Engines: Diesels and Hesselmans. **Fuel Systems, Governors, Lubrication Systems, Ignition Systems, Starters, Generators, Clutches, Transmission, Axles, Torque Dividers, Transfer Cases, Brakes, Steering,** etc., etc.

ALSO SERVICES buses, farm and industrial tractors, contractor and road building equipment, stationary power machinery, etc. (on all parts described in Manual.)

Offered on same FREE 7-Day examination as Auto Repair Manual. Check box in coupon at right.

MoToR **Published by MoToR, The Leading Automotive Business Magazine.** MoToR's manuals assure high standards of repair work.

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MoToR Book Dept., Desk 3B, 572 Madison Ave., New York 22, N. Y.
Rush to me at once: (check box opposite book you want).

☐ **MoToR's AUTO REPAIR MANUAL.** If O.K. I will remit $1 in 7 days, plus 35c delivery charge; $2 monthly for 2 months and a final payment of 95c a month later. (Price, $5.95.) Otherwise I will return book postpaid in 7 days. **(Foreign price, remit $8 cash with order).**

☐ **MoToR's TRUCK REPAIR MANUAL.** (Described at left.) If O.K., I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35c delivery charge with final payment ($8.35 in all). Otherwise I will return book postpaid in 7 days. **(Foreign price, remit $11 cash with order).**

Print Name _____ Age_____

Print Address _____

City _____ Zone No. (if any)_____

State _____ Occupation_____

☐ **SAVE 35c!** Check here if enclosing full payment. (Check, M.O. or Postal Note) WITH coupon. We then pay 35c shipping cost. Same 7-day return-refund privilege.

INVENTORS

The inventor who believes he has a new and useful invention, and finds himself in need of advice, should consult a competent registered patent attorney.

The question as to whether a subject matter is patentable can be substantially determined by a search of the U. S. Patent records.

Without obligation, write us for information as to what steps an inventor should take.

RANDOLPH & BEAVERS

Registered Patent Attorneys

761 Columbian Bldg., Washington 1, D. C.

RANDOLPH & BEAVERS
761 Columbian Bldg., Washington 1, D. C.
Please send me full information on how to secure Patents & Trademarks.

Name .....

Street .....

City ..... *State*.....

INVENTING

—FOR PROFIT! If you have an inventive turn of mind, write for free 28-page booklet explaining how the Institute of American Inventors is helping inventors pretest the profit possibilities of proposed devices to fill today's unprecedented demand for *useful* new inventions.

INSTITUTE of AMERICAN INVENTORS

Dept. 5, 1926 Eye St., NW, Washington 6, D. C.

COLLECTOR'S ITEMS

Listed in the **CLASSIFIED SECTION**

ON PAGE 184

INVENTORS

WITH GOOD INVENTIONS

Should write us without delay for FREE BOOKLET, Protective Disclosure Form and facts about The Inventor's Most Logical Markets. Patented, Unpatented inventions, all kinds. Cash, Royalty, needed by specific manufacturers. If your invention is for sale, write today for full particulars. A Post-Card will do! Address:

THE INVENTION REPORTER

2E-11108 South Longwood Drive Chicago 43, Ill.

PATENTS

AND TRADE MARKS

C. A. SNOW & CO.

Registered Patent Attorneys Since 1875

Write for Free Book and "Certification of Invention" form

427 SNOW BUILDING, WASHINGTON 1, D. C.

Your Invention Clinic

[*Continued from page 20*]

less than 5-cents each if you expect to be able to remain in business. For this nickel you must provide toy, package, instructions, shipping cartons, bills, advertising, stationery, rental, phone, salaries of workers and all other charges. Still think you can do it? If so, go ahead with alacrity. Both items should sell.

Record Player

Russell E. Borgese of New York, N. Y., asks if we think it worthwhile for him to continue work on an automatic record player which will play both sides of the record, particularly in view of the fact that some such mechanism has been reported as being available.

ANSWER: *If every inventor felt the same way there would be few inventions of value. Maybe your device will not be as good as others in which case you should either make improvements or forget the design entirely. Perhaps it will be better, in which case you should proceed further.*

Regardless of how good your system might appear you will find that other devices for the same purpose will appear on the market. If yours is considered the best by the consumer who ultimately will purchase the product, you need have no fears for the future nor will you have cause for being disturbed because someone else thought of performing a similar task. By all means, continue your efforts. There should be a market for a satisfactory device to perform this function.

Transfer Liquid

Elinar Robertson of Minneapolis, Minn., says that he wants to give some of his magazines to the Veterans Hospitals, but wants to preserve some of the articles. "When I was young," he writes, "my mother used to buy a transfer liquid which would transfer the printed sheet to another sheet without damaging the original copy. What is the liquid?"

ANSWER: *That is a difficult question to answer because we don't know what your mother bought. However, there are many formulas for transfer liquids. The simplest is soap, alcohol and water; the better ones are paraffin wax dissolved in benzene. Ordinary paraffin wax rubbed on the paper works fine. Try it. You apply a coat of the liquid to the paper, then turn it face down on the printed sheet and rub with the bowl of a spoon.*

The system is useless on a well printed magazine but works from newspaper stock. However, even if it worked well it probably would not serve your purposes because all letters and figures are backwards. Remember, you have a transfer.

Why not try microfilming or photography or direct contact printing on paper? Photo books will tell you how to do this.

HOW'S THE WEATHER UP THERE?

THIS ingenious device is a rocket-driven projectile about 16 feet long and a foot in diameter. Developed by the Army Ordnance Department, it is used by the Signal Corps to obtain accurate data on weather conditions 30 to 50 miles up in the ionosphere—far beyond the range of aircraft observation or radiosonde.

The projectile is powered to reach altitudes as high as 250,000 feet. There it releases parachutes and equipment capable of recording temperature, barometric pressure, humidity, electrical conductivity and other characteristics while dropping slowly to earth.

Long-range weather forecasting is only one of the fascinating fields of research being explored in the new Regular Army. The place for keen young men, eager for experience in such promising careers as Advanced Electronics, Radar, Nuclear Energy, Jet Propulsion and Supersonic Flight is here—in the front line of scientific advance.

Excellent pay—the equivalent of more than $3000 a year in a civilian job—liberal leave, educational and retirement benefits, and the chance a 3-year enlistment gives you to *choose* your arm or service among those still open—make this the opportunity of a lifetime! Get full details at your nearest U. S. Army Recruiting Station.

• Listen to "Sound Off," "Warriors of Peace," "Voice of the Army" and "Proudly We Hail" on your radio.

★ ★ ★

YOUR REGULAR ARMY SERVES THE NATION AND MANKIND IN WAR AND PEACE

A GOOD JOB FOR YOU

U. S. Army

CHOOSE THIS FINE PROFESSION NOW!

NOW! Enjoy Learning to Speak SPANISH AT HOME

FRENCH-GERMAN-ITALIAN

BIG OPPORTUNITIES and JOBS waiting for those who can speak Spanish. Millions of dollars being invested in Mexico, Central and South America—BUSINESS AND TRAVEL increasing every day. Now the ability to speak Spanish will mean more to you than ever before.

Only 15 Minutes a Day

The CORTINA METHOD, famous for OVER 60 YEARS, teaches you to speak SPANISH LIKE A NATIVE. Right in your own home, relaxed and at ease, you learn as easily as a child learns — BY LISTENING to native instructors on these 30 NEW, easy-to-understand CORTINA recordings. EVERY WORD CLEAR AS A BELL.

Sent on 5 Days Approval

THOUSANDS have learned SPANISH this quick, easy way for PLEASURE and BUSINESS. Why not you? FREE, 32-page book. "The Cortina Short-Cut," describes this famous method fully and tells how you can try it in your own home for 5 days. NO COST IF NOT DELIGHTED. Mail coupon for free book.

Write Today—NOW!

CORTINA ACADEMY (Established in 1882)
Dept. 272, 105 W. 40th St., New York 18, N. Y.

Please send me—without obligation—your free book. I am interested in (check):

☐ SPANISH ☐ FRENCH ☐ ITALIAN ☐ GERMAN

Name .....

Address .....

City ..... State .....

Photography for PLEASURE or PROFIT

Learn at home. Spare time. Practical basic training. Long-established school. Many have earned while learning. Send coupon below for free booklet, "Opportunities in Modern Photography" and full particulars.

AMERICAN SCHOOL OF PHOTOGRAPHY
1315 Michigan Avenue Dept. 2052 Chicago 5, Illinois

Send booklet, "Opportunities in Modern Photography," full particulars and requirements.

Name ..... *Age* .....
Address .....
City ..... *Zone* ..... *State* .....

ANALYZE HANDWRITING

Qualify for Certified Grapho Analyst Degree at home, spare time. Credit, Employment, Personnel Managers, Business, Professional men, women **use grapho-analysis in their work, earn substantial fees in spare time.** Many study solely for personal benefit, no desire to earn money, **find it so fascinating they start using it to add to their incomes.** Entertainment field pays well, up to $100 in a week reported. Others establishing profitable practices as Vocational and Family Problem Counselors, Personality Teachers, and lecturers.

GROWING—UNCROWDED PROFESSION

More and more police use grapho analysis handling suspects and criminals. They understand how criminals think. Their handwriting tells. Men like Hugh Dunlap, university student, Harry Allen, retired preacher, use it in court, win cases, earn fees even before graduation. **Only school in world devoted to teaching grapho analysis** offers thorough training to earnest, ambitious men and women regardless of where you live, small town, farm or city. Send for GRAPHO ANALYST, illustrated lesson, personal handwriting analysis offer, **ALL FREE.** Must be 21 or over. Address A. I. G. A. Inc., 134, Noel, Missouri.

FIX ANY RADIO

Amazing New Invention

Learn quickly to repair all radio sets. New, different **Comparison** method. No previous radio knowledge needed. Introductory training included. Simple, picture suggestions tell you where to look for faults and how to make the repair. No testers needed for most jobs. Manual 8½x11 in., 63 job-sheets. 24 blueprints. Many hints. New edition. Order manual S-3. Only $1.50, postpaid. Money back guaranteed.

SUPREME PUBLICATIONS 9 S. Kedzie Ave. Chicago 12, ILL.

Learn to MOUNT BIRDS

Tan SKINS, make up FURS

Be a Taxidermist. *Double your hunting fun.* We teach you **at Home.** Mount **Birds, Animals, Fish, Heads,** common specimens. **Fun and profits.** Decorate home and den **MAKE MONEY.** Mount game, tan for others. Big profits in spare time. **WRITE TODAY. 100 game pictures in Hunters, get your copy. It's Now Free.** Send post card. State your AGE.

FREE BOOK

NORTHWESTERN SCHOOL OF TAXIDERMY
Dept. 2862 Omaha, Nebraska

Start Home Mail Order Business

Start small—grow big. Amazing new course shows you the way. Gives methods, secrets and procedure for entering the most fascinating business in the world—THE MAIL ORDER BUSINESS.

Rush your name and address today for full particulars —No obligation.

BELFORT
(Dept. S) Engineering Bldg., Chicago 6, Illinois

SALESMEN FOR CITY AND COUNTY

Nationally Known Manufacturer

Build up a **business of your own** with Nationally Advertised Products bearing Underwriters' label. Sell to schools, factories, service stations, warehouses, hotels, restaurants, public institutions, truck and bus companies, grain elevators, house trailers, autos, farms, homes, etc. **Capable man can earn real money.** Established in 1916. *Write letter with details, age, experience, etc.*

Dept. 91-26, FYR-FYTER CO., Dayton 1, Ohio

Find OPPORTUNITY Where DEMAND is Great!

AUTO BODY and FENDER REPAIRING

You men who are tired of being rutted in your job should look into a field where demand is huge—and gives every indication of growing even larger! Such a field is AUTO BODY and FENDER REPAIRING. As long as there are cars on the road, there'll be dents and bumps to be fixed, body repairs to be made, replacements of worn or damaged parts! The more cars—the more WORK!

Millions of old cars are on the road today, with fenders and bodies in great need of repair and refinishing. Thousands are rolling off production lines now. Within a short time they'll be coming into shops for maintenance.

Here is a Trade that Needs Manpower!

The man with ambition recognizes great opportunity here for lifetime work, either at a dependable job or in his own business. For AUTO BODY and FENDER REPAIR is the kind of business which can be started with small capital. And, what's more, AUTO BODY and FENDER REPAIRING, as taught by UEI, is easy to learn! No previous experience nor high school education is necessary—what's needed is a liking for mechanical work.

Old Established School Offers Practical Training

HOME STUDY AND SHOP PRACTICE

UEI's Course in *Auto Body and Fender Repairing* is arranged so you can begin your study in spare time, without interfering with your present job. You learn about auto body repairs and refinishing, body alignment, and many other subjects. Then, when you have completed your home study, you continue your course here in our well-equipped residential school where you receive practical experience in the repairing and refinishing of damaged bodies, tops, doors and fenders, the replacing of door panels and turret tops, use of tools, spray painting, acetylene welding, under personal supervision of capable instructors.

GET FULL FACTS FREE!

Since 1927, UEI has trained thousands of men for new opportunity fields, and students are making good. If **you** want to get ahead, get full facts about Auto Body & Fender Repairing, and its opportunities. Don't wait—investigate now. Mail coupon today.

OTHER U.E.I. TRAINING OPPORTUNITIES

Practical Shop Training after preliminary Home Study.

DIESEL
Engine Operation, fuel systems, auxiliary equipment, repairs and maintenance.

WELDING
Arc and Acetylene. With fundamentals of metallurgy and supervised welding practice.

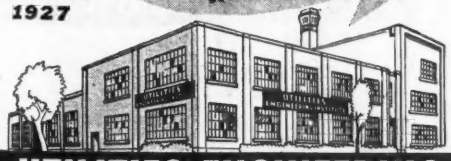
REFRIGERATION
Servicing and installation for all commercial and domestic types.

AIR CONDITIONING
Installation, operation and maintenance of home and industrial equipment.

WRITE FOR FREE INFORMATION

FILL OUT AND MAIL COUPON

Founded 1927



UTILITIES ENGINEERING INSTITUTE

1314 W. Belden Ave., Dept. X-1S. Chicago 14, Ill.

Utilities Engineering Institute, Dept. X-1S
1314 W. Belden Ave., Chicago 14, Illinois

Yes! Send me the facts FREE about the field checked below.

☐ Auto Body and Fender
☐ Diesel Engine ☐ Refrigeration
☐ Welding ☐ Air Conditioning

NAME_____ Age_____

Address_____

City _____ ZONE or COUNTY_____ State_____

☐ If World War II Veteran give length of service_____
☐ Check here for special information if you are under 17.

The great SUCCESS instruction for anybody now in business or planning to get into PRODUCTIVE work . . . . . The PROFITABLE, EASY, SURE method . . . . . Get it NOW

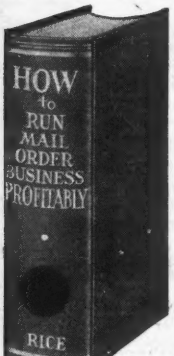
HOW TO MAKE MONEY BY MAIL

ENLARGED TO 640 PAGES 15th EDITION

Down-to-earth facts, directions (*illustrated*) for running business profitably, using expertly for YOUR good fortune the employees, trains, planes which Gov't places at your disposal CHEAP. Get orders by mail, ship by express or freight or mail, get out of the kindergarten . . . 15th edition, enlarged to 640 pages, now selling. It's YOUR winner. Make this year and the following years worth more. . . . . THIS knowledge really PAYS OFF.

THE EASY WAY

to start new or expand your present occupation. Do it NOW.



Extraordinary plain, simple skill, know-how. No theory. Fact story of rich experience of author E. Rice day-by-day. How many times have we heard: "I wish I had some money; this patent would earn me a fortune," or "why can't my crop pay better?" or "I wish I knew how to sell this gadget myself," or "why should my boss alone do this when I too know how the money is made? . . .

YOU DO NOT NEED MONEY TO START THIS RICE WAY

Listen, you do not need money to start this Rice way. His method automatically pays all bills same day rendered, no bank loans, pay as you go, no borrowing from relatives or friends, no salesmen. Also no worry, quickly a home of your own all paid for. Rice paid off $5,000 in mortgages a year after using this skillful idea.

46 Years of PROOF

Sounds fishy? Sure, but this has been done steadily for 46 years, depression or no depression, by the author: that is why he wrote this book, to pass the good word along. Make it go with anything you have which is salable, or with what you are now doing. Rice made his pay plan go from the start when living in one room in a city lodging house. Turn your city or country home, your work your hobby, into money. How to get orders coming steadily at cost of only $4 for each $100 taken in. The popular error to avoid in trying for sales. Business won free while others have to pay for it. How to conceive the money-getting advertisement . . . Profitable changes from ordinary ideas and methods. Not usual cut-and-dried pattern, 250 adventures, a dictated book in everyday talk by Rice doing day by day what he discloses in his book can be done by his method. No dictionary writing. . . . Read how others are profiting big.

Take a chance on this book being worth a fortune to you and yours and send $2.95. Book mailed same day order is received. Hundreds of buyers whose letters we show you declare emphatically its superlative goodness. Follow its easy pattern for success. Cloth-bound, 640 pages, 8½ by 5½. Best seller, 15th edition now selling. Cut out the $2.95 HOW BOX here, pin or stick it to sheet of paper bearing your name and address, mail in envelope with money order or check for $2.95 to

HOW 640 Pages $2.95

HOWARD ST. HOUSE, Melrose 76K, Massachusetts

FREE NEW HOBBY HANDBOOK

A Gold Mine of Information on Newest Equipment, Materials, Tools for HOME CRAFTSMEN AND MECHANICS

IF you work in metals, woods, plastics or glass, you need this Big, FREE Source Book of equipment, tools, parts and materials . . . including dozens of hard-to-get items you can't find in stores. Many things you must have for your home hobby or shop. Just loaded with ideas and illustrations.

A WAREHOUSE OF THINGS YOU WANT

More than 100 items including: Portable Welder; Bench Tools; Plastic Molder; Telephone System; Chemical Sets; Spray Guns; Electroplater; Drills; Grinders; Tool Chests; Model Tools; Key Maker . . . everything you need for your hobby or craft. Send for this Big, FREE Book TODAY. Mail postcard or coupon below.

WARNER ELECTRIC CO., 1512 Jarvis, Chicago 26, Dept. L-116

WARNER ELECTRIC CO., 1512 Jarvis, Chicago 26, Dept. L-116
PLEASE SEND BIG, FREE BOOK
NAME.....
ADDRESS.....
CITY.....ZONE.....STATE.....

Radio Men Needed

The Finest in Radio Training

Train for well-paid position in Radio Engineering, Television, Electronics. Thorough courses in frequency modulaton, math, mechanical drawing, construction, repair, aviation and police systems, sales and service, broadcasting.

Approved For Veterans Under G. I. Bill

Low Tuition and Living Costs—Fine Climate—Hunting and Fishing. *New Classes Start Each Month. Write*

COL. H. C. WASHBURN, Dept. 3, Clovis, New Mexico

Benson Radio Institute

SIMPLE EASY INVENTION

TRIMS HAIR AT HOME!

SAVES BARBER BILLS

Trims hair as it combs! Easy! Quick! Keeps men's, women's children's hair trim, neat, freshly-cut looking *all the time!* Trims, tapers, thins out uneven hair. Use like ordinary comb. Safe. Simple.

No experience required. Fine for legs, underarms! Sells like wild! Sample offer sent immediately to all who send name at once. A penny postal will do. SEND NO MONEY. Just your name.

SAMPLES FOR AGENTS

KRISTEE CO., 769 Bar St., AKRON, OHIO

LAW

STUDY AT HOME for PERSONAL SUCCESS and LARGER EARNINGS. 38 years expert instruction—over 108,000 students enrolled. LL.B. Degree awarded. All text material furnished. Easy payment plan. Send for FREE BOOK—"Law and Executive Guidance," NOW!

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 74-X, 646 N. Michigan Ave., Chicago 11, Ill.

BUSINESS OPPORTUNITIES

YOU'LL FIND **PLENTY** LOOK ON 181

LEARN MEAT CUTTING At Home—In Spare Time

Get into the vital meat industry. Concise, practical Home Training based on 25 years proven instruction methods used at National's famous resident school. Prepares you for bigger pay as Meat Cutter, Supervisor, market manager or more money in your own store. Go as rapidly as your spare time permits. Diploma. Start NOW to turn your spare hours into money. Send for FREE bulletin today. No obligation.

National School of Meat Cutting, Inc., Dept. ME-32, Toledo 4, Ohio

---

AMAZING NEW ZIPPER SHOE SELLS LIKE LIGHTNING!

ZIPS ON... ZIPS OFF

• Here's your chance to start a fine, solid, profitable business right among your friends and neighbors. Tie up with the LEADER in the direct-to-wearer shoe industry, established 43 years. Just rush postcard NOW for FREE SAMPLE OUTFIT. Free 10-Second Air Cushion Demonstrator. Free Automatic Selling Plan. Learn how you can start making money very FIRST DAY with over 200 fast-selling Feature Style and Comfort Shoes.

Victor Thomas Shoe Co., Dept. V-786
610 W. Van Buren St., Chicago 7, Ill.

HUNDREDS OF THOUSANDS OF MEN

Appear

SLIMMER..

FEEL BETTER, LOOK YOUNGER

with COMMANDER

The Amazing NEW Abdominal Supporter

Yes, instantly, you, too, can begin to feel ALIVE . . . ON TOP OF THE WORLD by joining the Parade of Men who are marching up the highway of happier living with the COMMANDER, the amazing new Men's Abdominal Supporter.

GET "IN SHAPE" INSTANTLY AND ENJOY A HAPPY STREAMLINED APPEARANCE

The COMMANDER presents the exclusively designed "INTERLOCKING HANDS" principle for extra support where you need it most. It flattens the burdensome sagging "corporation" and restores to the body the zestful invigorating feeling that comes with firm, sure "bay window" control. Order this new belt today and begin enjoying the pleasure of feeling "in shape" at once.

BREATHE EASIER—TAKE WEIGHT OFF TIRED FEET

The helpful uplifting EXTRA SUPPORTING power of the COMMANDER firmly supports abdominal sag. The instant you pull on the belt you breathe easier . . . your wind is longer . . . you feel better!

YOUR BACK IS BRACED—YOUR CLOTHES FIT BETTER—YOU APPEAR TALLER

The COMMANDER braces your figure . . . you look and feel slimmer . . . your clothes fit you better. Your friends will notice the improvement immediately.

COMMANDER IS NEW AND MODERN!

The absence of gouging steel ribs, dangling buckles and bothersome laces will prove a joy. COMMANDER has a real man's jock type pouch. IT GIVES GENUINE MALE PROTECTION. Try this amazing new belt with full confidence . . . and at our risk. SEND FOR IT NOW!

Make This Test

with your own hands and feel what we mean

The Secret of the "Interlocking Hands"

Only COMMANDER contains this New principle. A porous non-stretch material is built into the special stretchy body of the COMMANDER . . . In the outline of two interlocking hands for EXTRA DOUBLE SUPPORT where you need it most. NO BUCKLES, LACES or STRAPS.

Commander Wearers All Over America Say—

"I am sure you will be pleased to know that it is by far the best and most practical supporter I have ever had. I have been pleased to show it to several of my friends and they are likewise impressed with it. You shall probably hear from some of them in the future."
—Dr. A. M. S., Standish, Mich.

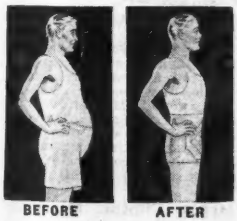
* * *

"Enclosed find order for another belt. I wouldn't be without this supporter for ten times what it costs."
—Dr. G. C. S., St. Charles, Ill.

* * *

"I recommend the Commander for what it is made for. It sure has been a great help to me. I want to thank you for what it has done. I might add it has helped me more than anything I have ever tried."
—P. N., Fort Knox, Ky.

Above are just a few of the many unsolicited testimonials for the Commander that we receive regularly. Originals of these and others are on file.



BEFORE AFTER

FREE 10 Day Trial!

If it fails to do all we say, send it back and the purchase price will be promptly refunded

Only $2.98

Special Large Sizes, 48 to 60, $3.98

SIZES 28 to 47

MAIL THIS COUPON TODAY

INTRODUCTORY TEN-DAY TRIAL OFFER

WARD GREEN CO., DEPT. T392
113 WEST 57TH STREET, NEW YORK 19, N. Y.

Send me the "COMMANDER" for ten days Trial. I will pay postman the special price of $2.98 plus postage. If not satisfied after wearing it ten days, I may return it and the purchase price will be promptly refunded.

My waist measure is ..... My height is .....

NAME .....

ADDRESS .....

CITY..... STATE.....

☐ Check here if you enclose $2.98 with this order and we will pay postage charges. The same refund offer holds.

LANGUAGE IS POWER

...Forge ahead, win special assignments, promotion, better job in global peace time opportunities through ability to speak a foreign language.

Speak SPANISH RUSSIAN PORTUGUESE GERMAN FRENCH ITALIAN

or any of 23 other languages by the

LINGUAPHONE METHOD

The World's Most Approved Language Course

It's all talk; natural, every-day conversation.

In your own home you can learn to speak any of 29 languages by the world-famous Linguaphone Ear-Eye Conversational Method. It is amazingly simple and practical. You HEAR voices of native teachers . . . they speak to you as often as you want them, never tiring . . . you REPEAT what they say, answer their questions . . . before you are actually aware, you are conversing in the language of your choice.

Save time, work and money, learn the Linguaphone Way which has helped thousands in the Army, Navy, Flying and Signal Corps and other services, as well as more than one million home-study students.

Available to Veterans under G I BILL OF RIGHTS

FREE—Get the facts about this time and money saving way to learn languages—send for the FREE illustrated Linguaphone Book.

LINGUAPHONE INSTITUTE
67 RCA Bldg., Rockefeller Plaza, New York (20)

LINGUAPHONE INSTITUTE
67 RCA Bldg., New York 20, N.Y.

Name .....

Address .....

City ..... State .....

Language Interested .....

Learn to Repair

ELECTRIC APPLIANCES

WRITE TODAY for FREE BOOK

Prepare now for a permanent future, independence and security with a business of your own. Our practical, easy-to-learn home course teaches you, during your spare time, how to repair washing machines, vacuum cleaners, electric ranges, lamps, motors, irons, etc., and do house wiring. Also how to get started on little capital. Write today for FREE BOOKLET. No obligation.

PACIFIC TRAINING SCHOOL
7217 S. Broadway, Dept. M-102, Los Angeles 3

LEARN ISOGONIC DRAFTING

The Drafting of Tomorrow

The first great advancement in Drafting in over 100 years!

INVESTIGATE this NEWEST development in the Drafting and Engineering fields. ISOGONIC Drafting opens up a NEW FRONTIER to those trained in its technique. Fits into EVERY branch of Engineering. ISOGONIC Drafting saves time and money, increases shop efficiency, steps up production. Pays well. Minimum background for success in this lucrative field—two years High School. Men now in drafting, by adding ISOGONIC Drafting to what they know now, become more capable, efficient and valuable. Spare time study at home. All texts and instruments furnished. For full details and descriptive folder, WRITE TODAY—give background of education and experience.

ISOGONIC INSTITUTE
Dept. "M," 1095 Market Street, San Francisco 3, California

PHOTOGRAPHY

FOR FUN OR PROFIT

STUDY AT HOME—Photography offers leisure time enjoyment and well-paid, fascinating career. Ever-increasing opportunities! Success-proved N.Y.I. training qualifies you at home. Also resident courses. Details FREE!

NEW YORK INSTITUTE OF PHOTOGRAPHY, (*37th Year*) Dept. 153, 10 West 33 St., New York 1, N. Y.

STAMMER?

This new 128-page book, "Stammering, Its Cause and Correction," describes the Bogue Unit Method for scientific correction of stammering and stuttering—successful for 46 years. *Free—no obligation.*

GET this FREE BOOK!

Benjamin N. Bogue, Dept. 2637, Circle Tower, Indianapolis 4, Ind.

CLASSIFIED

NOW ON PAGE 180

ADVERTISEMENTS

TOOL ENGINEERING • MECHANICAL DRAFTING MASTER MACHINIST

Completely equipped shops and drafting rooms, directed by an accredited staff of engineers and practical instructors. 18 years of successful training of men for industry.

Days, Evenings • Approved for Veteran Training

BULLETIN ON REQUEST

ALLIED SCHOOL OF MECHANICAL TRADES, INC.
1342 SOUTH MICHIGAN AVENUE • CHICAGO 5, ILLINOIS

CALLING ALL BOYS!

Yes, we're CALLING ALL BOYS, and we're calling YOU, too. Tune in on an interesting hobby that pays big returns in fun and interest. Even helps to prepare you for a career in radio. Learn how to make your own simple, tubeless, batteryless crystal radio. Just send 25c. We will send you postpaid by return mail a genuine Melomite crystal with complete illustrated instructions for making your very own set. Then you will enjoy competing with others for long-distant reception. With crystal and instructions we send The Magic Crystal, our own publication chock-full of news, diagrams, questions and answers of interest. Don't delay! Send 25c today!

ALLEN RADIO, Dept. MLS-2, Clinton, Missouri

ELECTRICIANS!

Get This Book of 150 Valuable Wiring Diagrams Free!

ACCEPT THIS AMAZING BOUND VOLUME AS MY GIFT TO YOU! . . .

B. W. COOKE
Director

Here's one of the greatest "get acquainted" offers ever made. This book of 150 Electrical Shop Prints and Wiring Diagrams is YOURS—absolutely FREE. IT'S an outright gift—you pay nothing to get it and nothing to keep it.

The book is "chuckful" of valuable charts, diagrams, wiring methods and instructions for reading and using wiring shop prints. You'll find its pages packed with up-to-the-minute electrical information. All the shop prints are full size with full explanatory information... they have all been developed and pretested in the big Coyne Training Shops. I WANT YOU TO HAVE THIS BOOK AS MY GIFT and HERE'S ALL YOU HAVE TO DO TO GET IT:

Examine My New 7 Volume Set

Get This Book of 150 Shop Prints Free!

To get your FREE copy of this Shop Print book all you have to do is to let me send you my complete new 7 volume set of electrical books—COYNE PRACTICAL APPLIED ELECTRICITY for 7 days FREE examination. Here's a set of books written for the "beginner" or "oldtimer" in electrical work who is anxious to get ahead. This 7 volume set covers everything electrical from house wiring to advanced DC & AC motors and equipment. Thousands of "show how" diagrams and photos.

BOOKS MUST EARN 5 TIMES THEIR COST OR YOUR MONEY BACK

I personally guarantee that at the end of 1 year after you receive these books, they must have earned five times their cost or you can return them and I'll refund every cent you paid.

SEND NO MONEY!

The new 7 volume set of practical electrical books is so NEW, so DIFFERENT and so UNIQUE that you have to see the set to really appreciate how much it can mean to you and your future. So here's what I'll do—I'll send you the complete set of 7 volumes (pictured below) at my risk, postpaid for 7 days FREE Examination. I'll also send you the New Coyne Book of 150 Shop Prints & Motor Diagrams as my FREE gift to you TO KEEP REGARDLESS OF WHETHER OR NOT YOU DECIDE TO KEEP THE 7 VOLUME SET COYNE PRACTICAL APPLIED ELECTRICITY.

Keep ALL the books 7 days. If not 100% pleased with the 7 volume set just return it and you owe nothing. If you keep the 7 volumes you can pay for them at the special low rates shown here in the coupon at right.

7 AMAZING VOLUMES

Covers everything from home wiring to DC-AC Motors and Equipment. Over 3000 subjects—2000 illustrations—5000 facts.

VOL. 1 Electrical Principles & circuits—signal systems—telephony; 450 pages.

VOL. 2 Wiring for Light, Power—Neon, Fluorescent, Aviation Lighting—Household Appliances—Farm Electricity; 460 pages.

VOL. 3 D.C. Motors and Controls, installation, operation and Maintenance, Welding—520 pages.

VOL. 4 A.C. Motors and Controls — Electronics—700 pages.

VOL. 5 Armature & Stator Winding and Repair—350 pages.

VOL. 6 Refrigeration & Air Conditioning; Radio—510 pages.

VOL. 7 Automotive, Diesel and Battery—420 pages.

Coupon Is Not An Order —UNLESS You Decide to Keep the Books

YOU'RE NOT BUYING THIS SET WHEN YOU SEND THIS COUPON, you're merely asking to see them FREE for 7 days. The coupon becomes an order **only if you decide to keep the 7 vol. set after 7 days' examination. SEND COUPON NOW!**

FREE BOOK COUPON

B. W. Cooke, Dir., Coyne Electrical School, Dept. 27-K1
500 South Paulina St., Chicago 12, Illinois

Send me the NEW 7 volume set COYNE APPLIED PRACTICAL ELECTRICITY. Also send me the bound volume of 150 Shop Prints which I am to keep FREE WHETHER I KEEP THE 7 VOL. SET OR NOT. I'll either return the 7 volume set in 7 days and keep the 150 Print book and owe nothing or I'll keep the 7 vol. set and pay $3.00 in 7 days and $3.00 per month until $21.00 is paid or send $19.75 cash. You include FREE one year consultation service and Technical Bulletins.

NAME_____ Age ____

ADDRESS_____

CITY_____ Zone____ STATE_____

☐ Check here if you want to pay postman cash price of $19.75 (you save $1.25) delivered. Same 7-day examination privilege and Money-Back Guarantee.

COYNE ELECTRICAL SCHOOL
Dept. 27-K1 500 S. Paulina St., Chicago 12, Ill.

How to Write

For Extra Income or Full Time Career, Learn At Home To Write Articles, Mysteries, Short Stories.

Beginner Credits Success to Palmer

"I had never written a single line before starting your course. Today I am unable to write fast enough to keep up with sales, all of which is entirely due to your coaching." Hugh G. Jarman, Montreal.

The public's new interest in technical, mechanical subjects offers big new opportunities for scientific minded writers who are trained to make dry facts interesting and exciting.

You don't have to be a *great* writer to make *good* money—using experiences of your own, of friends—or just your imagination. Many beginners start earning while learning, selling short stories, articles of all kinds, which bring in small but welcome checks of $25, $50, $100 and more. Such material may be turned out quickly once you acquire the proper technique. And now it's easier to learn than you may imagine, through Palmer's unique method of training—for NOT just one field of writing, but for *all:* Fiction, Article, Radio.

You Learn To Write By Writing

You receive *individual* coaching by professional writers who go over your writing, giving you helpful suggestions and showing you how to correct weaknesses, how to capitalize on your good points. Thus *your own individual writing style* is carefully developed. Study fast or slow. Save time and effort. To find how you too may make money writing—part time or full time—send today for FREE illustrated book. Palmer Institute of Authorship (since 1917), 6362 Hollywood Blvd., Hollywood 28, Calif. Desk Y26.

FREE BOOK Palmer Institute of Authorship Since 1917
6362 Hollywood Blvd., Hollywood 28, Calif., Desk Y26

Please send me free illustrated book "The Art of Writing Salable Stories," explaining how your training helps new writers get started. This is confidential. No salesman will call.

Mr.
Mrs. .....
Miss

Address .....

City..... Zone.... State.....

CLASSIFIED ON PAGE 180

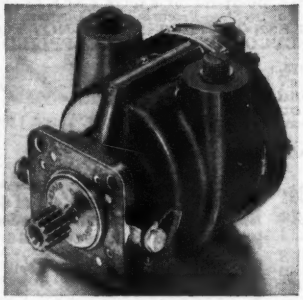
WAR SURPLUS BARGAIN SPECIAL

BRAND NEW VACUUM-AIR HYDRAULIC

FUEL PUMP

Original Cost $45.00
Now Only
$9.95

Postpaid In U. S. A.



Adaptable for use on Home Oil Burners, Spray Machines, Milking Machines, Compressors, Vacuum Pumps, Hydraulic Systems, Presses, etc. Originally cost $45.00 Used by the Air Corps to drive bomber de-icer boots, gyroscopes, automatic pilots, etc. May be used as air or fluid pump—for pressure or vacuum. Standard 3/8 inch pipe thread with interchangeable ports. Will pump 7½ gal. SAE 30 oil per minute at 300 RPM. Builds air pressure of 30 lbs. per sq. in. at 1000 RPM. Vacuum will draw 26 inches of mercury at 1750 RPM. Runs forward or reverse. Self aligning shaft. Die cast aluminum housing 6x4x4 inches. Stainless steel vanes and impeller. Wgt. 4¼ lbs. Made by Bendix Avia. Corp. Spline terminal for direct drive—readily replaced with a pulley. Recommend a ¼ H.P. or stronger electric motor as source of power. Rated capacity 1500 RPM with high overload factor. Special price for quantity users. Send check or money order today. Postpaid in U. S. A.

GROBAN SUPPLY CO. 1522 So. Michigan Ave. Dept. MIF, Chicago 5, Ill.

5 lbs. HANDY ASSORTMENT $1.98

FOR MECHANICS — GARAGES — WORKSHOPS — HOME USE

SCREWS • NUTS • BOLTS • WASHERS
RIVETS • SPRINGS • BRACKETS • MISC.

MORE THAN 1,000 PIECES—5 full pounds—a veritable treasure chest of fastening devices for every practical use. Satisfaction guaranteed. Order now $1.98

SPECIAL—2 assortments, over 2,000 pieces, for $3.69.

Get on our FREE Bargain Mailing List—Many other valuable assortments to meet every need!

Hudson Trading Corporation
F1517 N. Wells St.
Chicago 10, Ill.

NEW CHEAP OIL BURNER

FOR COOKING & HEATING STOVES-FURNACES

HEAT YOUR HOME, COOK YOUR MEALS WITH CHEAP FURNACE OIL

NO MORE SHOVELING COAL OR ASHES. A New Fuelizer Starter Vaporizing System turns Cheap 130 Flash Furnace Oil, Distillate, Kerosene, etc. into Oil Gas heat without clogging up. LIFETIME GUARANTEE against defects. *$1.00 Bonus Offer for Testing.* We will let you try it in your own stove or furnace for one month. Get yours for introducing. Big Profits QUICK. Be first. Send in your name TODAY.

NORTHWEST MFG. CO. 566-B Mitchell, So. Dakota

Correspondence Courses In RADIO and ELECTRICAL ENGINEERING LOW AS $25

ELECTRICAL ENGINEERING. Get good grasp of wide electrical field. Modern. Very understandable. Theory made easy. **RADIO ENGINEERING.** Extra fine course in radio, public address, photo-electric work. Trains you to be super-service man, real vacuum tube technician. Tuition ONLY $25, either course. Deferred payment plan. Servicemen needed badly.

FREE Write for free copies of school catalogs, student magazines, etc.

LINCOLN ENGINEERING SCHOOL, Box 931, MI-146, Lincoln, Nebr.

HOW TO BEAT HIGH LIVING COSTS!

Take Orders for Lovely DOEHLA Greeting Cards, Notes, Gift Wrappings!

YOU can make big spare-time money, *without experience*—showing friends, co-workers these 16 nationally-advertised assortments. So beautiful they *sell on sight!* You make as much as 50c on boxes that sell for $1. Make EVEN MORE on bonus orders from churches, clubs. FREE TRIAL! Write for sample boxes on approval. If friends don't snap them up, return at our expense.

INCREASE YOUR INCOME This friendly way!

HARRY DOEHLA CO., Dept. S-2, Fitchburg, Mass.

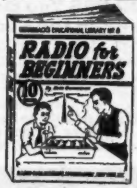
SUIT YOURS AS A BONUS

AND BIG MONEY IN SPARE TIME, TOO

We want you to wear this fine made-to-measure suit! Make it yours by sending a few orders, & earn BIG CASH PROFITS in spare time. Your suit will help you get more orders with scores of rich, quality fabrics, tailored-to-measure to newest styles. Also Ladies' Tailored Suits—complete line. Write today for **FREE SAMPLES** NO EXPERIENCE, no money needed. For quick action tell us about yourself.

J. C. FIELD & SON, INC.
Harrison and Throop Sts., Dept. P-1502 Chicago 7, Ill.

Get Started in Radio



TEN "HOW-TO-DO-IT" BOOKS

Get a solid foundation in radio by means of these 10c timely text books. Each clearly written, profusely illustrated, contains over 15,000 words. You'll be amazed at the wealth of information packed into these handy books. Excellent for reference—ideal for technical library. Your money back if not satisfied.

5 BOOKS FOR 50c—10 BOOKS FOR $1.00

SENT TO YOU POSTPAID

No. 1—How To Make Four Doerle Short Wave Sets
No. 2—How To Make The Most Popular All-Wave 1 and 2 Tube Receivers
No. 3—Alternating Current for Beginners
No. 4—All About Aerials
No. 5—Beginners' Radio Dictionary
No. 6—How To Have Fun With Radio
No. 7—How To Read Radio Diagrams
No. 8—Radio for Beginners
No. 9—Simple Electrical Experiments
No. 10—Television

Remit by check or money order—register letter if you send cash or stamps.
RADIO PUBLICATIONS 21R WEST BROADWAY NEW YORK (7)

Now While these Great Industries Go Forward

Make Your Decision

For a Better Job or a BUSINESS of YOUR OWN NOW'S the TIME

AIM HIGH—PICK ONE OF THESE BIG FIELDS

- REFRIGERATION AND AIR CONDITIONING
- AUTOMOTIVE MECHANICS
- BODY, FENDER REBUILDING
- ELECTRICITY

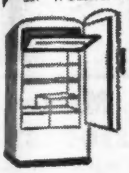
REFRIGERATION and Air Conditioning, the Automotive Field, the Electrical Industry are rapidly making up for lost time. There may never again be such opportunities for men who want better jobs or business of their own to get in on ground floor and go up fast! Yes—FOR MEN WHO ACT FAST, THINGS CAN HAPPEN FAST!

YOU CAN'T AFFORD to WAIT YOUR FUTURE DEPENDS on WHAT YOU DO TODAY.

A Few Short Weeks Can Make All the Difference

COMMERCIAL TRADES INSTITUTE was only civilian school selected by Army to train service men for refrigeration. In motive trades our institute gained nation wide fame training Auto Mechanics for U.S. Army. Same quality training available to you now. If over 17 and under 60 learn how you can get started. CONSULTATION AND PLACEMENT SERVICE WHETHER YOU ARE INTERESTED IN WORTHWHILE JOB OR SETTING UP YOUR OWN BUSINESS.

TRAIN AT HOME
IN SPARE TIME OR IN OUR
WELL EQUIPPED SHOPS

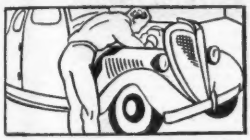


REFRIGERATION and AIR CONDITIONING

Trained men paid well to service, install, maintain, repair, rebuild household and commercial refrigerators. Important new developments such as Frozen Foods, and many new industrial uses. Opportunities for full time, spare time earnings. Begin training at home in spare time, finish in our big modern shops, or come directly to shops.

At home you get C.T.I.'s SHOP PROVED HOME STUDY instruction—actual shop experience has gone into the practical lesson assignments. That is why it is easy for mechanically inclined men to learn by our Home Study training, and start on actual refrigeration work.

AUTOMOTIVE MECHANICS · BODY & FENDER REBUILDING



Progress rapid by our learn-by-doing SUPERVISED SHOP TRAINING. Efficient auto mechanics get excellent pay. Learn to overhaul and repair engines, transmissions, differentials and other assemblies.

Body and Fender Rebuilding offers profitable work. Get good, practical "all-around" training—welding, aligning, mixing and matching colors, spray painting, power and hand tools. Values increased when used cars are made to "look like new."

A NATIONALLY KNOWN AND RECOGNIZED INSTITUTION

HOME OF COMMERCIAL TRADES INSTITUTE

MODERN SHOP TRAINING — ELECTRICITY — ELECTRICAL SERVICING

Modern Shop Training in Electricity

Get ready for good job or business of your own. Electricity is the heart of modern industry. Electricians always needed, earn higher pay, work year around. Make rapid progress in step-by-step practical shop training in Electrical Wiring and Circuits; Armature Winding; Electrical Appliance Repairs; Electro Plating and Welding. Rural Electrification, the Building Boom, many new uses of Electricity opening more opportunities in this vast field. Get training under thoroughly experienced instructors, be ready in few short weeks for Job Opportunities in Electricity.

COMMERCIAL TRADES INSTITUTE, DEPT. E-32
1400 Greenleaf, Chicago 26, Ill.

FREE — IMPORTANT INFORMATION Telling HOW TO GET STARTED IN ONE OF THESE GREAT FIELDS

VETERANS — Veterans qualifying under "G.I. Bill" have tuition paid by Government plus monthly subsistence allowance while in school. Just mail coupon, we will handle all details. (LOW TUITION, EASY TERMS if you are not a veteran.)

SEND THE COUPON NOW ➡

FILL OUT · CUT OUT · MAIL TODAY!

FACTS FREE FOR MEN WHO WANT TO GET AHEAD

COMMERCIAL TRADES INSTITUTE, Dept. E-32
1400 W. Greenleaf, Chicago 26, Ill.

Send free illustrated Brochures and other information about the field I have checked below.

☐ Refrigeration and Air Conditioning ☐ Automotive Mechanics
☐ Electricity ☐ Body & Fender Rebuilding

Name .....

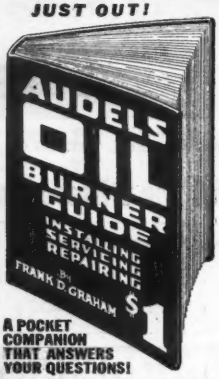
Address .....

City ..... State .....

☐ Veteran ☐ Non-Veteran

OIL BURNER
INFORMATION IN A HANDY FORM

JUST OUT!



A POCKET COMPANION THAT ANSWERS YOUR QUESTIONS!

AUDELS OIL BURNER GUIDE – A new practical, concise treatise, 384 pages–31 Chapters – 321 Diagrams and Illustrations – covering Domestic and Industrial Oil Burners.

New from Cover to Cover, for mechanics interested in Oil Burners. Gives practical inside working knowledge of theory, construction, installation, operation, testing, servicing and repair of all types of oil burners. Includes electrical hook-ups and wiring diagrams of automatic control systems.

PRICE $1 POSTPAID

Get this information for yourself. Mail coupon today. No obligation unless satisfied.

ASK TO SEE IT

AUDEL, Publishers, 49 W. 23rd St., New York 10, N.Y.

Please mail AUDELS OIL BURNER GUIDE (Price $1). If satisfactory, I will remit $1 on its safe arrival, otherwise I will return the book.

Name _____

Address _____

Occupation _____

Employed by _____ MM

No Waiting to LEARN

START NOW TO EARN!

This BIG BOOK SHOWS HOW

924 BIG PAGES ILLUSTRATED

!! IT'S RESULTS YOU WANT—GET ACTION QUICKLY WITH THESE PRACTICAL IDEAS

Never before has a more helpful book been printed for those planning a business of their own. Gathered in this large illustrated volume are the formulas, recipes, facts and secrets that have contributed so largely to America's great industrial progress. Capitalize on this information for making most any conceivable product without experience, special equipment or previous knowledge of chemistry. Start at home, expand with profits—build for a profitable independence.

The experts who compiled this book are authorities, and present this information in simple, understandable language. They also give you wholesale supply sources for needed materials, short cuts and economy methods for the most profitable results. Hundreds of good paying businesses have been built on a product made from a simple recipe. Opportunities in this field exist everywhere. Choose from any of the 162,000 facts and 10,000 formulas of which the following are only a very few: Adhesives, Alloys, Anti-Freeze Solutions, Cosmetics, Beverages and Liquors, Candy, Gum, Casein, Celluloid, Ceramics, Cheese, Cleaning Preparations, Concrete, Copper, Cotton, Dentifrices, Depilatories, Dyes, Embalming Fluids, Enameling, Glass, Glazes, Household Formulas, Inks, Insecticides, Iron, Jewelers' Formulas, Lacquers, Laundry Preparations, Leather, Linoleum, Lubricants, Manicure Preparations, Marble (artificial), Metals, Mirrors, Oils and Ointments, Paints, Paper, Perfumes, Photography, Polishes, Powders, Remedies for Man, Beast or Fowl, Rubber Products, Refrigerants, Soaps, Solder and Soldering, Tooth Cements, Transfers, Transparencies, Varnishes and Thousands of others for making all sorts of profitable and practical things.

—ALSO—

We include Free—our new book of helpful money-making information:- "The More You Know the More You Can Earn—Easier and Quicker."

FORTUNES MADE FROM A SINGLE IDEA!

This comprehensive book is an accepted authority by chemists, schools, industry, etc. and is the largest and most comprehensive book of its kind ever issued. Nothing else like it in existence. A single formula has been worth a thousand times this book's small cost to countless owners. Crammed with money-making ideas. Invaluable for reference. Ideal for Factory, Home, Farm, Office or Workshop. As necessary as the dictionary and more useful for manufacturers, chemists and salesmen who put up products for profit.

POSTPAID $3.50 U.S.A. $3.85 FOREIGN

$3.50 postpaid. Canada or Foreign, $3.85 U.S. Funds. (C.O.D. shipments U.S.A. Only). Immediate Shipment—Safe Delivery Guaranteed.

ADAMS BROWN COMPANY **BOOKS OF APPLIED SCIENCE**
Dept. 372, Chestnut Hill 67, Massachusetts, U. S. A.

BECOME A SERVICE EXPERT

REFRIGERATION and AIR CONDITIONING

Millions of Older Units Need Expert Service. Big After-the-War Expansion Will Create Even More Opportunities

Approved for Veterans "G.I." Training

Now, not "next week," is the time to start training for a top-pay job in this vital field. A drastic shortage of trained service experts exists. Many thousands more will be needed for big post-war expansion caused by new industrial uses. Train NOW to get your pick of best jobs. We will give you the practical training you need. For 2 years we trained men and women for the Army and Navy only, in fine-precision aircraft instrument work. So our methods must be right. Common schooling is all you need. Our unique system makes everything easy to grasp. You can train at home and in our big Chicago shops. Write for full facts TODAY, without obligation.

INDUSTRIAL TRAINING INSTITUTE
2150 Lawrence Avenue, Dept. P4F, Chicago 25, Illinois

Learn BAKING at home

Baking is one of America's high industries in wages. Not seasonable, but year 'round good field for trained and experienced men. Thorough basic spare time home study course lays solid foundation. If you have the aptitude for this type of work, send for FREE Booklet, "Opportunities in Commercial Baking."

NATIONAL BAKING SCHOOL
1315 S. Michigan Ave., Dept. 2052, Chicago 5, Ill.

"How to Make Money With Simple Cartoons"

A book everyone who likes to draw should have. It is free; no obligations. Simply address

CARTOONISTS' EXCHANGE
Dept. 352-D Pleasant Hill, Ohio

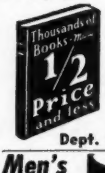
Thrilling Work COLORING PHOTOS at Home

Fascinating hobby and vocation learned at home by average man or woman who is artistically inclined. Work full or spare time. Modern method brings out natural, life-like colors. Many have earned while learning. FREE BOOKLET tells how to get started doing this delightful home work for photographers, stores, individuals, and friends. *Send today for your copy.* No obligation.

EASY TO LEARN

NATIONAL PHOTO COLORING SCHOOL
1315 S. Michigan Ave., Dept. 2052, Chicago 5, Ill.

ANY BOOK IN PRINT



Delivered at your door. **We pay postage.** Standard authors, new books, popular editions, fiction, reference, medical, mechanical, children's books, etc. **Guaranteed savings.** Send for Clarkson's 1947 catalog.

FREE Write for our great illustrated book catalog. A short course in literature. The buying guide of 300,000 book lovers. **Free if you write now—today!**

CLARKSON PUBLISHING COMPANY
Dept. ML472, 1257 So. Wabash Ave., Chicago, Ill.

Men's Superb Watch

15 JEWEL SWISS $17.50

15 Jeweled movement insures accuracy, dependability. Waterproofed! Radium dial and hands. Sweep second hand. Unbreakable crystal. Stainless steel back. The Swiss master watch craftsmen put these superb movements in handsome, lustrous, chrome cases. Truly a distinctive watch priced to sell quickly.

WRITTEN GUARANTEE WITH EACH WATCH'

Wear for 10 days at our risk and expense. SEND NO MONEY. Simply pay postman $17.50 plus 10% tax and postage on delivery. Cash orders sent postpaid. Limited supply.

United Products Co., 7941 S. Halsted St., Dept. RR-162, Chicago 20, Ill.

PRESTO! ANYONE CAN MASTER GLAZE

Car Owners! Meet Master Glaze—the sensationally different luster for new and used cars! Not a wax—not an oil polish—not a paint!—nothing that "smears" over the surface. **MASTER GLAZE** is a unique discovery—a creamy liquid—quick and easy to apply! Gives a hard, glass-like surface. Even gasoline cannot dull it! Lasts six months to a year! Amazing luster—beautiful, sparkling clean and brilliant! Doesn't finger-mark—doesn't smear! A match box full glazes an entire car. Seals the pores—protects! NOTHING LIKE IT!

AGENTS An unusual opportunity! Quick, flashy demonstrator. Big profits. Good territory. Write today!

FREE SAMPLE

Just send your name and address today to

MASTER GLAZE CO., 7720-568 W. Harwood Ave., Milwaukee, Wis.

NOW! EASY-TO-MAKE HOMECRAFT NOVELTIES

FOR PLEASURE AND PROFIT!

FREE! NEW 40-PAGE CATALOG

Our new free book is crammed with money-making facts about Leather Craft, Wood Carving, Clay Modeling, Lacing and Braiding, Wood Burning (Pyrography), Showcard Lettering, Ready-to-Finish Woodcraft, Plastics, Marblite Molding, and much more. Send for FREE copy TODAY!

SPECIAL! EASY MONEY-MAKER!

Newest fashion idea. Leather Link Belts. Very smart for both men and women. Kit including everything for six easy-to-make belts (2 white, 2 black, 1 brown, 1 natural) to sell at $2 each ($12 total) sent to you complete for only $3.50 postpaid. Or C.O.D., you pay postage. (No Canadian C.O.D.'s and no foreign shipments made.) Money back if not delighted. Sample Kit (1 belt) $1.

DWINNELL CRAFT SHOP, Dept. X-27, Elm Grove, Wheeling, W. Va

LAW

STUDY AT HOME for PERSONAL SUCCESS and LARGER EARNINGS. 38 years expert instruction—over 108,000 students enrolled. LL.B. Degree awarded. All text material furnished. Easy payment plan. Send for FREE BOOK — "Law and Executive Guidance." NOW!

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 74-X, 646 N. Michigan Ave., Chicago 11, Ill.

LEARN PORTRAIT PAINTING AT HOME

• Previous art training or talent NOT necessary. This new Stuart System teaches you, in 11 simple, easy-to-follow lessons, to make *exact* charcoal and oil likenesses. Guidance for your every step. Send for free book *today*.

STUART STUDIOS.
121 Monument Circle, Room 202, Indianapolis 9, Ind.

Please send me free book and outline of lessons.

Name .....

Street .....

City..... *State*.....

---

the book to give you a flying start in building model planes

By Gene Johnson

Here are the 13 full-scale plans included in this book:

- Aeronca "K" Seaplane
- Bell P-59A "Airacomet"
- Corsair F4U
- Curtiss "Tiger Shark"
- Erco Ercoupe
- Grumman "Hellcat" F6F-3
- Grumman "Wildcat" F4F-4
- Northrop P-61 "Black Widow"
- Phantom Flash R.O.G.
- Piper Cub Cruiser—Model J5
- Republic "Thunderbolt" P-47D
- Sikorsky R-6 Helicopter "Sparky"

TELLS and shows how to select and make tools and materials; how to cut, shape and assemble fuselage, wings, empennage, propellers, landing gear and all accessories; how to cover and shape the assembled model. Directions for building gliders, stick, solid scale, built-up scale and flying models and helicopters. Each operation shown, step by step. 82 pages of illustrations plus a giant 3 sheet insert of full-scale working plans to build 13 popular plane models. *Just published.*

Price—$3.00

SHIP MODEL BUILDING

BY GENE JOHNSON

Includes full-scale, complete working plans for building a Clipper Ship and a Gloucester Fisherman

Here the beginning home craftsman will find all the fundamentals needed to get a start in ship model building—beginning with the simplest steps and leading up to the completed ship. You don't have to be a tattooed Barnacle Bill to make a professional looking ship model. With the simple and entertaining directions—with the over 750 illustrations which make every step clear—the amateur as well as the experienced model builder, will be able to look at his completed model with pleasant astonishment and say, "Did I make that?"

242 Pages—More than 750 illustrations

Price—$2.50

HOBBY BOOK MART, Dept. X-2
150 Nassau Street, New York 7, N. Y.

Please send me the book or books I have checked below. If not satisfied, I can return for full refund.

( ) Airplane Model Building _____$2.50

( ) Ship Model Building _____$2.50

☐ I enclose $_____in full payment. Send books postpaid.

☐ Send C.O.D. for $_____plus postage.

Name _____

Address _____

City & Zone_____ State_____

Sorry, no C.O.D. orders outside of U. S. Send remittance with order.

ELECTRICIANS! RADIO MEN!

Earn More Money!

Get this new GIANT SIZE

ELECTRICAL and RADIO TROUBLE SHOOTING MANUAL

GUARANTEED BY COYNE

Yours 10 Days Free

OVER 500 Large Size Electrical and Radio Shop Prints -How to read and use them

Needed by war workers, maintenance men, beginners, old timers! Nothing else like it. Saves time, helps boost your pay . . . **4 GREAT BOOKS IN ONE!** 1. New Step-by-Step Trouble Shooting Course. 2. 500 Shop Prints. 3. Elec.-Radio Dictionary. 4. Spare Time Jobs.

FREE! 1 yr. Technical Counsel by mail from COYNE staff, on trouble-shooting problems.

SEND NO MONEY! See offer below. Satisfaction guaranteed by famous COYNE "Learn-by-Doing" Electrical School. Rush coupon now!

FREE TRIAL COUPON

BOOK DIVISION, Dept. 27-K2
COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Chicago 12, Ill.

Send, W.o.t. all shipping charges paid, your new COYNE Electrical and Radio Trouble Shooting Manual. Within 10 days after getting it I'll either return it or send $3, then $3 monthly until total of $3.95 is paid. [ ] Cash price [ ] C.O.—**you save over 10%.** Same 10-day free trial and return privilege.

NAME_____ Age_____

ADDRESS_____

CITY_____ Zone____ STATE_____

NOW! Build Your Future On DIESEL Opportunities

LOOK around you. See the way tractors, trucks, buses, railroads, ships, power plants and equipment of many kinds are "going Diesel." Every day new opportunities are opening—in industrial and farming communities—for trained men who can install, maintain, operate and repair Diesel engines. Plan now to build your future in this growing field.

Diesel Knowledge is Earning Power

You don't have to give up your present job. Now, you can begin learning DIESEL in spare time at home. UEI practical training teaches you, step by step, how Diesel engines operate, how fuel systems work, repairs, accessories and auxiliary equipment; a world of Diesel "know how." Includes actual practice on Diesel equipment in our shop under expert guidance. UEI training methods are successful. For 20 years they have helped mechanically inclined men better themselves.

NOW IT'S UP TO YOU!

Coupon below brings you all the facts without cost or obligation. Get going today! MAIL COUPON NOW.

Send Coupon for FREE FACTS

UTILITIES ENGINEERING INSTITUTE Diesel Division
1314 W. Belden
Dept. 227-D,
Chicago 14, Ill.

Founded 1927

UTILITIES ENGINEERING INSTITUTE, Diesel Division
1314 W. Belden Ave., Dept. 227-D, Chicago 14, Ill.
Please send me Free Facts about Diesel opportunities and training.

NAME_____ Age_____

ADDRESS_____

CITY_____ Zone or County_____ STATE_____

☐ Check here for special information if you are under 17.
☐ Check here if Veteran of World War II.

LEARN AT HOME TO MOUNT BIRDS

Animals, Heads, Fishes, Pets; to TAN. Be a Taxidermist. Profit and FUN.

Hunters, save your valuable **TROPHIES.** Mount ducks, squirrels, everything. Learn to **TAN** for leather and furs. Wonderful **HOBBY** Have a **HOME MUSEUM. BIG PROFITS** mounting for others. **INVESTIGATE NOW.**

FREE BOOK With 100 fine game pictures. **NOW** absolutely **FREE. Write TODAY.**

Send Postal TODAY for FREE BOOK. State AGE.
N. W. SCHOOL OF TAXIDERMY, Dept. 2762, Omaha, Neb.

LEARN ELECTROPLATING

Highly Paid, Uncrowded, Interesting Business. Part or Full Time, Common School Education Sufficient. Gold, Silver, Nickel, Chromium, etc. Money Making Secrets, Processes. Send postcard for FREE Electroplating Booklet and proof. **PLATER HYDE, Dept. I, P. O. Box 176, National City, California.**

Store Route Plan PAYS BIG MONEY

SELL COUNTER CARD PRODUCTS

Build a good-paying business of your own. Call on dealers of all kinds; show nationally-advertised Aspirin, Vitamins, Cosmetics and 200 other necessities. Big 5c and 10c retail packages, high quality. Attractive counter displays sell goods fast. Free book gives amazing facts. Write! **World's Products Co., Dept. 14-K, Spencer, Ind.**

Do You Like This

AMAZING DISCOVERY! Guaranteed to correct poor penmanship in few days—big improvement in three hours, no failures. Complete Outline Free. Write, C. J. Ozment, 36, St. Louis, Mo., IMMEDIATELY.

Thomas E. Lattin
President

I WANT TO TRAIN YOU For A Big-Paying Job IN THE MEAT BUSINESS

Big-pay jobs go to expert Meat Cutters—essential trade—PEOPLE MUST EAT! Become Meat Cutting and Meat Merchandising expert in 6 weeks at Toledo. Learn easily, quickly. Actual practice. Training methods based on 30 years' experience. Training for beginners or men with experience. Be own boss in profitable market. Diploma. Approved for training under G. I. Bill. Write TODAY for FREE facts. No obligation.

National School of Meat Cutting, Inc., Dept. 53, Toledo 4, Ohio.

DO YOU

WANT a permanent business profession of your own? Learn the Stephenson Method of making and fitting corrective arch supports. Earnings of men and women in this profession run as high as $50 to $100 weekly. Not medical or chiropody—easy terms for home training—no further capital needed, no goods to buy, no agency. Write for free booklet. 51 years in business.

STEPHENSON METHOD, 112 Back Bay, Boston, Mass.

CARTOON YOUR WAY TO SUCCESS!

DON'T COPY — LEARN TO ORIGINATE

RAYE BURNS will teach you HOW to CREATE ORIGINAL CARTOONS at home that you may SELL! Course contains 26 lessons and over 600 illustrations. All for *only* **$2.85**

Send name and address for free details.

RAYE BURNS SCHOOL, Dept. F, Box 3583, Cleveland, Ohio

WHAT OUTFIT?

YOUR OWN DIVISION'S Official Signal Corps Battle Action Pictures. Order now!

Complete Set of
20 - 4x5
GLOSSY PICTURES
Any Division - - Any Campaign
only **$2.00** postpaid

State division and Campaigns wanted. Enclose $2.00 for each set. Money instantly refunded if you're not pleased.

OFFICIAL WAR PICTURES CO.
64-40 98th Street Dept. MI Forest Hills, N. Y.

PRACTICAL TECHNICAL TRAINING **FOR YOU**

Specialize in **Electronics, Radio, Electricity, Refrigeration, Heating and Air Conditioning, or Welding**

Prepare in six or twelve months for position as Technician, or in three years secure your B.S. Degree in **ELECTRICAL ENGINEERING** with a Machinery or Electronics Major.

Write for booklet, "Career Building."

MILWAUKEE SCHOOL of ENGINEERING
Institute of Electrotechnics

MI-247 North Broadway and E. State Milwaukee, Wis.

Audels PRACTICAL ELECTRIC LIBRARY

Answers YOUR QUESTIONS!

WHAT EVERY ELECTRICIAN WANTS TO KNOW

Is easily found in AUDELS ELECTRIC LIBRARY. Electricity made simple as ABC. Practical inside trade information for the expert and ALL electrical workers.

Questions, answers, diagrams, calculations, underwriter's code; design, construction, operation and maintenance of modern electrical machines and appliances FULLY COVERED.

All available at small cost, easy terms. BOOK-A-MONTH service puts this Important information in your hands for 6¢ a day. You can start your subscription with any volume.

Write TODAY for Electric Folder and FREE TRIAL offer.

AUDEL, Publishers, 49 W. 23rd St., New York 10, N. Y.

Mail Vol. I, Electric Library on 7 days' free trial. If O.K. I will remit $1.50, otherwise I will return it. I also request you to mail one book each month on same terms. No obligation unless I am satisfied.

Name.....

Address.....

Employed by..... MM

HOW YOU CAN BUILD A MIGHTY BODY

Quickly! Easily! Pleasantly
—In 10 minutes a day in your own home

"The World's greatest molder of men"—at last reveals to you in these five complete book-courses (value $5 each)

1. How YOU Can Build a Chain-Breaking ARM!

A. PASSAMONT
First prize for physical perfection.

Let me give YOU, TOO, such a pair of chain-breaking biceps. The strongest-armed man in the world, George F. Jowett, planned this course for you. His great experience stands as proof that YOU, TOO, can get the arms men respect and women admire.

Complete Arm Course, now only 25c

2. How YOU Can Build a Big Barrel CHEST!

REX FERRIS
Champion of South Africa, says, "I owe everything to Jowett Methods."

Look at the Heroic Chest of this Jowett Pupil. A powerhouse of energy. Ferris writes, "I want to add my sincere gratitude to that of thousands of pupils for wonderful results from your course. Your course is by far the best." If you have a narrow, sunken chest I can improve it so that you will be proud to show it off.

Complete Chest Course, now only 25c

3. How YOU Can Build a Rock-like BACK!

CHAS. SCHAFFER
an amazing Jowett product. Once a puny weakling. Now versatile athlete.

Look at his rock-like Back now! He says, "You have worked wonders for me. You are head and shoulders above the rest in your profession." Let me help YOU, TOO, build a back of power. Square shoulders with enviable military spread. A spine as strong as a steel shaft.

Complete Back Course, now only 25c

4. How YOU Can Build a Steel-vice GRIP!

W. BURNS
A Jowett-made Olympic Strength Champion.

YOU, TOO, can have a Manly Grip like this Jowett pupil. What would you give for a forearm like that, with its bone-crushing grip? Fingers strong as steel pincers. A hand like an iron vise. YOU, TOO, can get these symbols of real manliness. I have proved to thousands this is no mere dream. Let me mold a pair of arms like this for you . . . with a grip of might. A handshake that will win friends—success.

Complete Grip Course, now only 25c

5. How YOU Can Build Pile Driver LEGS

BOB MITCHELL
A Jowett Champion—not in words but by ACTUAL RECORDS.

What would you give to have the all-round human strength of Bob Mitchell? It's reasonable to assume that what I have done for thousands, I can do for you. I myself increased my thighs by 8 inches, my calves by 5 inches, by this simple, unbeatable method. I'll help you build legs that are real props of leaping, tireless power!

Complete Leg Course, now only 25c

Last Chance! Get All 5 Picture Courses for $1.00

Send for them now and learn the "World's Greatest Secrets of Body Building." FREE! Marvelous Photo Book of Famous Strong Men, "Nerves of Steel—Muscles like Iron".

RUSH COUPON NOW

BOOK WITH PHOTOS OF FAMOUS STRONG MEN
MAIL COUPON NOW **FREE**

George F. Jowett
Champion of Champions

Jowett Institute of Physical Culture
230 Fifth Avenue, Dept. MI-72B, New York 1, N. Y.
George F. Jowett: Your proposition looks good to me. Send by return mail, prepaid, the courses checked below, for which I enclose ( ). Include FREE book of PHOTOS.

☐ All 5 courses for . . . $1 ☐ Molding Mighty Legs 25c
☐ Molding a Mighty Arm 25c ☐ Molding a Mighty Grip 25c
☐ Molding a Mighty Back 25c ☐ Molding a Mighty Chest 25c
☐ Send all 5 C.O.D. ($1 plus postage.) No orders less than $1 sent C.O.D.

NAME..... AGE.....
(Please print plainly. Include zone number.)

ADDRESS .....

AUDELS Carpenters and Builders Guides

4 vols. $6

Inside Trade Information for Carpenters, Builders, Joiners, Building Mechanics and all Woodworkers. These Guides give you the short-cut instructions that you want—including new methods, ideas, solutions, plans, systems and money saving suggestions. An easy progressive course for the apprentice and student. A practical daily helper and Quick Reference for the master worker. Carpenters everywhere are using these Guides as a Helping Hand to Easier Work, Better Work and Better Pay. To get this assistance for yourself, simply fill in and mail the FREE COUPON below.

Inside Trade Information On:

How to use the steel square—How to file and set saws—How to build furniture—How to use a mitre box—How to use the chalk line—How to use rules and scales—How to make joints—Carpenters arithmetic—Solving mensuration problems—Estimating strength of timbers—How to set girders and sills—How to frame houses and roofs—How to estimate costs—How to build houses, barns, garages, bungalows, etc.—How to read and draw plans—Drawing up specifications—How to excavate—How to use settings 12, 13 and 17 on the steel square—How to build hoists and scaffolds—skylights—How to build stairs—How to put on interior trim—How to hang doors—How to lath—lay floors—How to paint

THEO. AUDEL & CO., 49 W. 23rd St., New York City

Mail Audels Carpenters and Builders Guides, 4 vols., on 7 days' free trial. If O K. I will remit $1 in 7 days, and $1 monthly until $6 is paid. Otherwise I will return them. No obligation unless I am satisfied.

Name.....

Address.....

Occupation.....

Reference..... MM

Now You Can Join CLUB PLAN For

BUSINESS SUCCESS

FREE Full Details and Illustrated Brochure

Club Plan of Practical Business Administration now offered men in business and industry who want to follow a program in order to move up to executive positions. Plan available to employed men who wish advancement with present employer or elsewhere. Program will not interfere with present job. Serious minded, ambitious men invited to send for free facts at once.

AMERICAN TECHNICAL SOCIETY, Dept. S-42
Drexel & 58th, Chicago, Ill.

How to Start YOUR OWN BUSINESS

Amazing Postwar Development Now Gives You the Opportunity to Make Money Fast!

Startling scientific discovery, just now becoming available for general use, will enable you to start your own business and reap great profits!

Plastics, one of the most revolutionizing and rapidly expanding industries, offers a great opportunity to all enterprising men and women. This is one of the few industries in which home manufacturers thrive and prosper. You can start even on a spare time basis in your own home, and expand rapidly into a full time business, paying good profits.

LIQUID MARBLE

Make LIQUID MARBLE the amazing Plastic, with a thousand uses. LIQUID MARBLE can be poured into FLEXIBLE MOLDS for casting all kinds of artistic and serviceable articles such as: ornaments, novelties, desk sets, paper weights, book-ends, souvenirs, statuary, toys, etc.

FLEXIBLE MOLDS

Make your own FLEXIBLE MOLDS. The cost is low—in fact, a large sized mold costs but a few cents. Hundreds of casts can be taken from a single mold.

NO EXPERIENCE NEEDED!

No skill or previous knowledge is necessary. All you do is follow our easy-to-understand instructions.

UNLIMITED MARKET

The market is literally unlimited. You will find steady year-round demand in your own community. Your problem will not be in Selling but in supplying the huge pent-up demand. Moreover, we supply you with names of big buyers for your finished products.

WRITE TODAY

Bing Products will show you how to start with a small investment and build a permanent, independent, profitable business! Don't fail to grasp this opportunity! Write today for FREE CATALOG.

BING PRODUCTS
Dept. E7, 88 Broad Street, BOSTON 10, MASS.

COMB-A-TRIM
THE NEW QUICK TRIMMER

Something New! Trim your hair without any experience. It's easy! The excess hair comes off smoothly and easily by just pulling trimmer through hair like an ordinary comb. Also removes hair from legs—armpits. Save on hair-cut bills . . . Trim your own hair or the whole family's. Send 59c and your Comb-A-Trim will be sent at once.

59c

SPECIAL OFFER
Send $1.00 for 2 Comb-A-Trims and save 18c. **2 for $1**

5 Extra Blades (Year's Supply) 25c

COMB-A-TRIM CO.
1734 Carew Tower Dept. M-23 Cincinnati, O.

LEARN TO WRITE PRODUCTIVE Sales Letters

Step up your earning power in your job or own business! Complete Home Study Course in **Advertising** and **Business Correspondence**. New scientific training method based on real sales psychology. Easy to learn in spare time. Earn more as you learn. The *knack* of making sales by mail pays big dividends. Write today for free illustrated folder.

BUSINESS LETTER INSTITUTE 802 MANHATTAN BLDG., CHICAGO 5, ILL.

START HOME NOVELTY MFG. BUSINESS

New course tells you in simple language how to make plaster novelties of many kinds at home.

Send your name and address right now for big descriptive folder which tells all about this new course and the opportunities that await you in the novelty manufacturing field.

JOSEPH H. BELFORT
(Dept. W) Engineering Building Chicago 6, Ill.

AMAZING MAGIC TRICK

Vanishing Card

Show it—then pitch it up into the air—it's now completely disappeared, yet when you reach into a spectator's pocket you produce the same card—it's complete, ready to perform, easy to do, price only

—"THE MAGICIAN"— **25c**

2463 Kensington Ave., Dept. CC, Phila. 25, Pa.

LEARN TRIG QUICKLY—EASILY

WITH QUICK TRIG, by competitive tests, it was found that QUICK TRIG gave answers faster to one with a slight knowledge of trig than to an expert on trig with a slide rule. Simply set the slides and read the answers for all three sides and angles of a triangle. Also gives degrees, sines, cosines and tangents of angles. Entirely automatic. Easy instructions included. We mail C.O.D. plus postage or enclose $1.00, the full price, and we will mail postpaid. Quick Trig Sine Circle included for only 50c extra. Send now, to

REED MFG. CO., 124-N W. 4th St., Los Angeles 13, Calif.

STUDY THE EDUCATIONAL OPPORTUNITIES ON PAGE 182

SWISS MUSICAL UNITS

Ready to install in your own musical box. Choice of Waltz, Operatic, or Classical Selections.

$4.50 each. Postpaid if cash with order. Literature on request.

Assembly & Repair Co.
Branch A, 582 Third Ave., N. Y. C. 16

IMAGINE THEIR JOY WHEN THEY FOUND THEY COULD PLAY this easy-as-ABC way!

LEARNED QUICKLY AT HOME
"I didn't dream I could actually learn to play without a teacher. Now, when I play for people they hardly believe that I learned to play so well in so short a time." *H.C.S., Calif.

PLAYS AT DANCES
"Your lessons have been most satisfactory. I can play all of the popular songs. I have earned money playing at dances." *E.N.J., New York.

PLAYS ON RADIO
"I can't keep from telling you that I have a good position playing from KTHS, Hot Springs, Ark., every morning." *J. S., Okla.

What Instrument Would You Like to Play?

JUST name your instrument and we'll show you how you can learn to play it—quickly, easily, in spare time at home. Never mind if you don't know one note of music from another—don't worry about "special talent." And forget all you've ever heard about music being hard to learn.

The truth of the matter is that *thousands now play who never thought they could!* Yes, men and women everywhere have discovered this amazingly easy way to learn music at home. Now they are enjoying the thrilling satisfaction of playing the piano, violin, guitar, saxophone or other favorite instruments. Some of them are playing in orchestras and over the radio; others are teaching music, making money in spare or full time. And thousands are having the time of their lives playing for their own enjoyment and the entertainment of their friends.

LEARN TO PLAY BY NOTE
Piano Guitar
Violin Saxophone
Organ Mandolin
Tenor Banjo
Hawaiian Guitar
Piano Accordion
Or Any Other Instrument

No tedious study and practice, no tiresome exercises. You learn to play *by playing*—start right in with the melody of a simple tune! It takes only a few minutes a day; the cost is trifling. Does it sound too good to be true? Mail the coupon and get the FREE PROOF!

FREE PRINT AND PICTURE SAMPLE

Fascinating illustrated booklet answers all your questions; free Print and Picture Sample shows how method works. If interested, just mail coupon. U. S. School of Music, 972 Brunswick Bldg., New York 10, N. Y.

**Actual pupils' names on request. Pictures by professional models.*

U. S. SCHOOL OF MUSIC
972 Brunswick Bldg., New York 10, N. Y.

I am interested in music study, particularly in the instrument indicated. Please send me your free illustrated booklet, "How to Learn Music at Home" and the Free Print and Picture Sample.

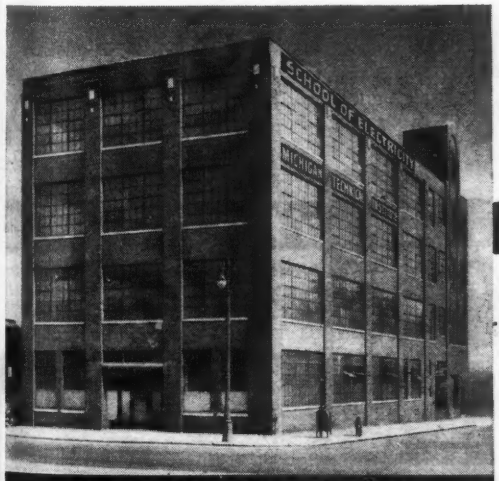
Name .....
(PLEASE PRINT)

Address .....

Instrument..... Have you Instrument?.....

GRASP THIS OPPORTUNITY

TO TRAIN YOURSELF FOR A WELL PAID JOB IN ELECTRICITY



MAIL COUPON *today*

This large, four-story building completely equipped with first class electrical equipment for *on-the-job, up-to-the-minute* methods of training in Armature and Motor Winding, Factory Wiring, House Wiring, Electrical Maintenance, Appliance Repair. Entire building—4 floors devoted exclusively to this one course. No crowding, plenty of space and light. Well staffed with instructors to give individual attention to students. Living quarters arranged for if desired.

Pay after you graduate . . . Lack of money need not hold you back. We will finance your training. After you graduate you can pay us back in small monthly payments.

VETERANS!!!

School approved for training under the GI Bill. Take this course at no cost to you, and receive $65 to $90 per month while training. Complete details furnished.

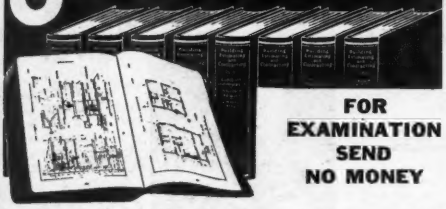
—MAIL COUPON TODAY—

MICHIGAN TECHNICAL INSTITUTE, Dept. I-2
2281 W. Fort St., Detroit 16, Michigan

☐ Please send me literature about your training.
☐ I am a G.I.

NAME.....
ADDRESS.....
CITY.....STATE.....

8 BIG BUILDING BOOKS



FOR EXAMINATION SEND NO MONEY

Learn to draw plans, estimate, be a live-wire builder, do remodeling, take contracting jobs. These 8 practical, profusely illustrated books cover subjects that will help you to get more work and make more money. Architectural design and drawing, estimating, steel square, roof framing, construction, painting and decorating, heating, air-conditioning, concrete forms and many other subjects are included.

BETTER JOBS—BETTER PAY

The postwar building boom is in full swing and trained men are needed. Big opportunities are always for MEN WHO KNOW HOW. These books supply quick, easily understood training and handy, permanent reference information that helps solve building problems.

UP-TO-DATE EDITION

These books are the most up-to-date and complete we have ever published on these many subjects.

Coupon Brings Eight Big Books For Examination

AMERICAN TECHNICAL SOCIETY Vocational Publishers since 1898
Dept. G2320 Drexel at 58th Street Chicago 37, Ill.

You may ship me the Up-to-Date edition of your eight big books, "Building, Estimating, and Contracting" without any obligation to buy. I will pay the delivery charges only, and if fully satisfied in ten days, I will send you $2.00, and after that only $3.00 a month, until the total price of only $34.80 is paid. I am not obligated in any way unless I keep the books.

Name _____

Address _____

City _____ State _____

Please attach a letter stating your age, occupation, employer's name and address, and name and address of at least one business man as a reference. Men in service, also please give home address.

WHEELS
AT BARGAIN PRICES

WE ARE OVERSTOCKED AND MUST MOVE THIS SUPPLY OF De Luxe BALL BEARING WHEELS

---- 8x2" Semi Pneumatic Tire, 7/16" Ball Bearing . $2.75 ea.
---- 10x1.75" Semi Pneumatic Tire, 7/16" Ball Bearing 3.25 ea.
(Price each Complete Wheel and Tire)

BUILD YOUR OWN Wagons—Scooters—Soap Box Racers — Baby Pens — Wheelbarrows — Welding Carts—Etc.

To order above wheels write number wheels wanted in space provided, tear out and mail this ad with check or money order and your name and address. If other sizes are wanted write for FREE LIST.

WRITE FOR FREE LIST OF 4 to 16 INCH WHEELS

TRULSON MANUFACTURING CO.
811 E. 31 Street, Dept. M1 Kansas City 3, Mo.

Locksmithing AND KEY MAKING Now Made Easy!

Big Success-Catalog yours FREE

Practical up-to-date course teaches you how to pick locks, de-code, make masterkeys, repair, install, service, etc. New self-instruction lessons for every handyman, a homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 easy illustrated lessons. **Low price!** Satisfaction! Free details, write NELSON CO., 1139 S. Wabash, Dept. B03, Chicago 5

STUDY ENGINEERING AT HOME
With An Educational Institution

Courses in ENGINEERING: Electrical, Civil, Mechanical, Drafting, Architectural, Automotive, Steam, Diesel, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Marine, Refrigeration, Air Conditioning, Chemical.
Courses in ARTS AND SCIENCES: Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture.
McKinley-Roosevelt Incorporated, 4610-DC, Sheridan Rd., Chicago 40, Illinois

AIR RIFLES BENJAMIN AIR PISTOLS
ARE IN PRODUCTION

ORDER BENJAMIN AIR RIFLES & BENJAMIN AIR PISTOLS from your DEALER. Send for our FREE FOLDER and Complete Specifications TODAY. Both Calibre Benjamin H-C Pellets are available now.

BENJAMIN AIR RIFLE CO., 814 MARION ST., ST. LOUIS 4, MO.

GOOD MONEY FOR YOUR SPARE TIME!

Be a Dealer in your locality for STRONG UNION MADE WORK GARMENTS AND SPORTS WEAR. No experience necessary. Easy work. Millions of workers buy work uniforms. Plan for the future. Send immediately for FREE Outfit. Limited number available.

ROBT. STRONG GARMENT CO.
319 W. Van Buren St., Dept. E-13
Chicago 7, ILL.

Make Your Own RUBBER MOLDS With RED LATEX MOLDING COMPOUND

Earn money, have fun; make your own molds for plaster objects. Produce novelties and gifts for home and to sell to friends. RED LATEX MOLDING COMPOUND (60% density) now available in quart and gallon quantities. Gives perfect results, easy to apply. Send for complete information and prices.

Francis Supply Co., Dept. B-1, 1836 E. Fulton St., Columbus 9, Ohio

MAKE MAGIC YOUR HOBBY

Be a Magician for Fun or Profit!

FREE! Large catalog of professional magical apparatus if you send 25c for the first issue of "MAGIC IS FUN," the new magazine that teaches how to do clever tricks with coins, cards, cigarettes, handkerchiefs, ropes, mind-reading effects, etc. Also teaches Sleight of Hand and Ventriloquism. Contains photos and fascinating life stories of famous magicians.

D. Robbins & Co., Dept. M-61, 152 W. 42 St., N.Y. 18, N.Y.

DRAW for MONEY . . . Be an ARTIST !

Trained Artists are Capable of Earning $50, $60, $75 A WEEK!

You can learn to draw at home in your spare time the well-known WSA way. COMMERCIAL ART, DESIGNING, CARTOONING all in ONE complete course. No previous Art experience necessary—we teach you step-by-step. Prepare for a fascinating hobby or profitable career. For 32 years WSA graduates have been making good—WHY NOT YOU?

VETERANS! WSA Approved for Training Under G. I. Bill. Write for FREE BOOK, "Art for Pleasure and Profit", fully describes course and commercial opportunities for you. TWO ART OUTFITS included with training.

WASHINGTON SCHOOL OF ART, Studio 202H
1115—15th St., N.W., Washington 5, D. C.
Please send me full information and your Free Book, "Art for Pleasure and Profit."

Name..... AGE.....
Street .....
City..... Zone.... State.....
☐ I am entitled to training under the G.I. Bill

PRACTICAL TECHNICAL TRAINING

COURSES

SERVICE— 6 months
Practical Electricity
Practical Welding
Refrigeration Service
Heating Service

TECHNICIAN— 12 months
Electro Technician
Radio Technician
Electronics Technician
Refrigeration, Heating and Air Conditioning Technician

PROFESSIONAL— 36 months
Electrical Engineering
Major in Machinery
or Electronics

Our time-tested CONCENTRIC SYSTEM enables you to build your career step by step. Each 6-month course is complete in itself. Stay as long as circumstances permit—until you reach your desired occupational objective. For 44 years this school has specialized in technical training.

More than 35,000 former students in industries the world over. 1,248 students now enrolled from 46 states and 5 foreign countries. Faculty of 63 specialists. World-wide alumni counselor committee. **Terms start January, April, July, September.** SEND COUPON TODAY!

MILWAUKEE SCHOOL OF ENGINEERING
A Technical Institute

Milwaukee School of Engineering, Dept. MI-247
N. Broadway and E. State, Milwaukee, Wis.
Without obligation, send me free booklet "Career Building" and more details on course in
.....
Name..... Age.....
Address .....
City..... State.....

Get Started NOW in DRAFTING

EXPERIENCE WHILE LEARNING
Your training will be experience because I give you practical jobs to do. And I list your experience and send it to employers as a reference when you are ready. All Dobe trained men start out with experience. You will too, because I will train you until you get a good pay job in drafting.

Take the first step now and step into Drafting—the big opportunity field—as an experienced, well paid draftsman. Act now for a better job, better pay and better working conditions. The field for draftsmen is bigger now than ever before for all new products, machines, construction start with the draftsman. Get into drafting now. I will train you at home in your spare time, and give you actual experience on actual work—the same kind of jobs you will do with the best paying firms. I will train you until you are competent, fully experienced, and holding a position that will bring advancement and pay raises. Write me today.

WORKING TOOLS SENT WHEN YOU START
All drafting instruments and table and other needed equipment sent when you start. Nothing to buy. Act today. Mail coupon to me now and be sure to give age.

MAIL COUPON FOR VITAL FACTS

Engineer Dobe, Div. 41, Libertyville, Ill.
Send me the Vital Facts on Drafting and Industrial Designing, your Free Book and advertised list of positions for Draftsmen and Designers wanted.
Name..... Age.....
Address .....
City..... Zone..... State.....

Keep that "Car" TICKING"

7 DAYS FREE TRIAL

1588 PAGES
1500 ILLUSTRATIONS

Every operator and mechanic needs AUDELS AUTO GUIDE.

This book saves time, money and worry. Highly endorsed. It presents the whole subject of auto mechanics:
1—Basic principles
2—Construction
3—Operation
4—Service
5—Repair
Handy Size. Easily understood.

NEW FLUID DRIVE, HYDRAULIC SHIFT AND DIESEL ENGINES FULLY COVERED

Over 1500 pages—1540 illustrations showing inside views of modern cars, trucks and buses with instructions for all service jobs.

$4 COMPLETE • PAY ONLY $1. A MONTH ←
ASK TO SEE IT!—To Get This Assistance for Yourself Simply Fill in and Mail Coupon Today.

AUDEL, Publishers, 49 West 23rd St., New York
MAIL AUDELS NEW AUTO GUIDE for free examination. If O.K. I will send you $1 in 7 days; then remit $1 monthly until price of $4 is paid. Otherwise I will return it.

Name.....
Address.....
Occupation.....
Employed by..... MM

PAA Reports on ICS

"Conscientious study of I.C.S. Courses proves their value beyond doubt."

R. D. CHARLES
Maintenance Superintendent
Africa-Orient Division
Pan American World Airways

RECORDS of Pan American World Airways tell you plenty about the value of I. C. S. Aviation Courses. They show that hundreds of Pan American pilots, co-pilots, flight engineers and maintenance men have taken I. C. S. Courses.

Now flying for just one division of the airline — Latin American — are 336 pilots and co-pilots who are holders of I. C. S. diplomas.

What better endorsement could there be of any institution offering training for Aviation careers?

If *you* are planning for a place in Aviation, you owe it to yourself to mail the coupon today for full information on the famous I. C. S. Courses. Do it *now!*

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS

BOX 2325-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course *before* which I have marked X:

Air Conditioning and Plumbing Courses
☐ Air Conditioning
☐ Heating ☐ Plumbing
☐ Refrigeration ☐ Steam Fitting

Chemistry Courses
☐ Chemical Engineering
☐ Chemistry, Analytical
☐ Chemistry, Industrial
☐ Chemistry, Mfg. Iron & Steel
☐ Petroleum Refining ☐ Plastics
☐ Pulp and Paper Making

Civil Engineering, Architectural and Mining Courses
☐ Architectural Drafting
☐ Architecture
☐ Bridge and Building Foreman
☐ Building Estimating
☐ Civil Engineering
☐ Coal Mining
☐ Contracting and Building
☐ Highway Engineering
☐ Lumber Dealer
☐ Reading Structural Blueprints
☐ Sanitary Engineering
☐ Structural Drafting
☐ Structural Engineering
☐ Surveying and Mapping

Communications Courses
☐ Electronics
☐ Practical Telephony
☐ Radio, General
☐ Radio Operating
☐ Radio Servicing
☐ Telegraph Engineering

Electrical Courses
☐ Electrical Drafting
☐ Electrical Engineering
☐ Electric Light and Power
☐ Lighting Technician
☐ Practical Electrician

Internal Combustion Engines Courses
☐ Auto Technician ☐ Aviation
☐ Diesel-Electric
☐ Diesel Engines ☐ Gas Engines

Mechanical Courses
☐ Aeronautical Engineering
☐ Aircraft Drafting
☐ Flight Engineer
☐ Foundry Work
☐ Heat Treatment of Metals
☐ Industrial Engineering
☐ Industrial Metallurgy
☐ Machine Shop
☐ Mechanical Drafting
☐ Mechanical Engineering
☐ Mold-Loft Work
☐ Patternmaking—Wood, Metal
☐ Reading Shop Blueprints
☐ Sheet-Metal Drafting
☐ Sheet-Metal Worker
☐ Ship Drafting ☐ Ship Fitting
☐ Tool Designing
☐ Toolmaking
☐ Welding—Gas and Electric

Railroad Courses
☐ Air Brake ☐ Car Inspector
☐ Diesel Locomotive
☐ Locomotive Engineer
☐ Locomotive Fireman
☐ Railroad Section Foreman

Steam Engineering Courses
☐ Boilermaking
☐ Combustion Engineering
☐ Engine Running
☐ Marine Engineering
☐ Steam Electric ☐ Steam Engines

Textile Courses
☐ Cotton Manufacturing
☐ Rayon Weaving
☐ Textile Designing
☐ Woolen Manufacturing

Business and Academic Courses
☐ Accounting ☐ Advertising
☐ Arithmetic ☐ Bookkeeping
☐ Business Correspondence
☐ Business Management
☐ Certified Public Accounting
☐ Commercial
☐ Cost Accounting
☐ Federal Tax
☐ First Year College
☐ Foremanship ☐ French
☐ Good English ☐ High School
☐ Higher Mathematics
☐ Illustrating ☐ Motor Traffic
☐ Postal Service
☐ Salesmanship ☐ Secretarial
☐ Sign Lettering
☐ Spanish ☐ Stenography
☐ Traffic Management

*Name*_____ *Age*____ *Home Address*_____

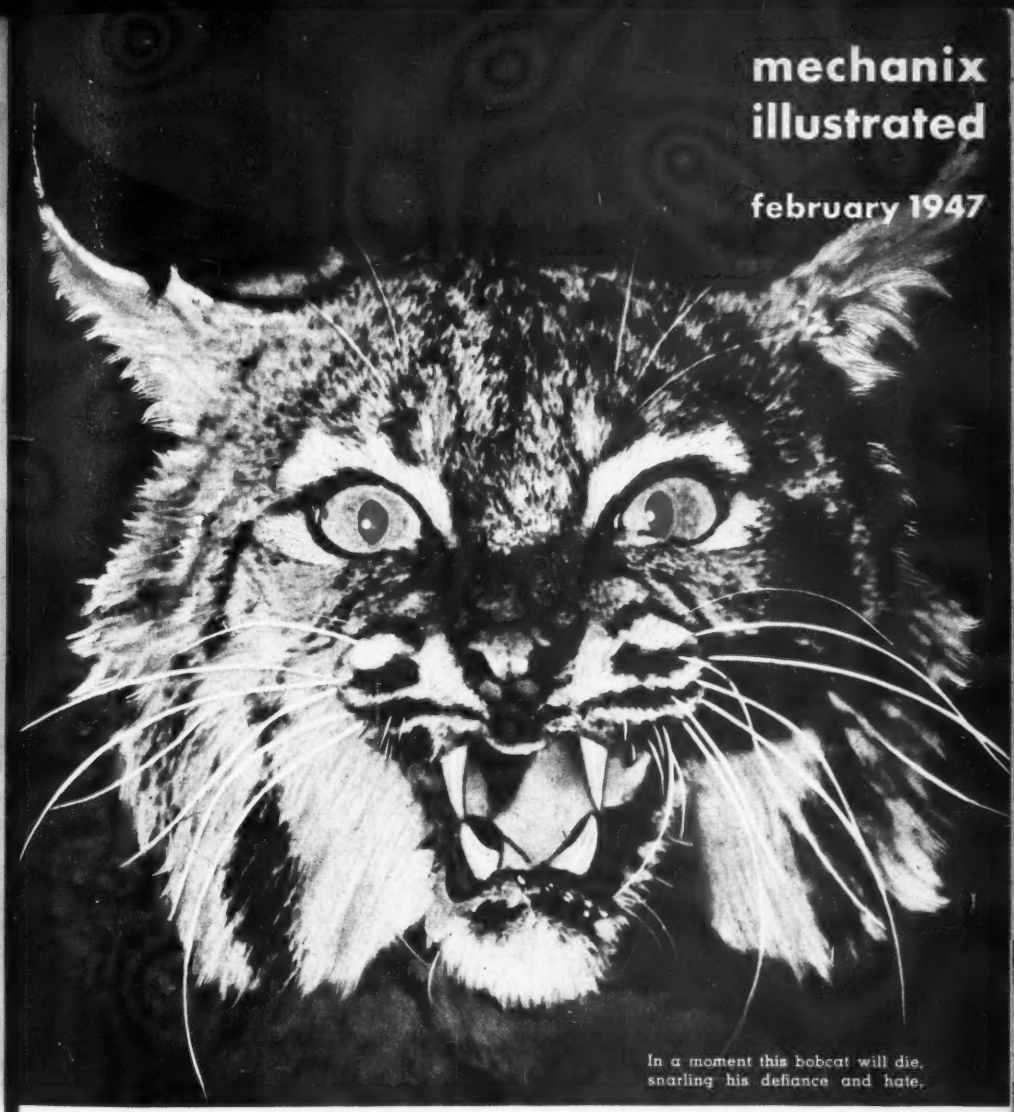
*City*_____ *State*_____ *Present Position*_____

*Working Hours*_____ *A.M. to*_____ *P.M.* **Length of Service in World War II**_____

Special tuition rates to members of the Armed Forces. Enrollment under the G.I. Bill of Rights approved for War II Veterans. Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

mechanix illustrated

february 1947



In a moment this bobcat will die, snarling his defiance and hate.

Trapper à la car

These professional trappers of predatory animals cover their trap-lines via automobiles.

TO MANY, the name "trapper" conjures up a picture of a romantic figure, clad in a heavy mackinaw and fur cap, living in an isolated cabin near Hudson Bay, tramping over miles of trap-line on snowshoes, and making only rare trips to civilization by means of his dog sledge. This is Jack London's or James Oliver Curwood's trapper.

Caught! And only a few feet from the road used by his trapper-nemesis.

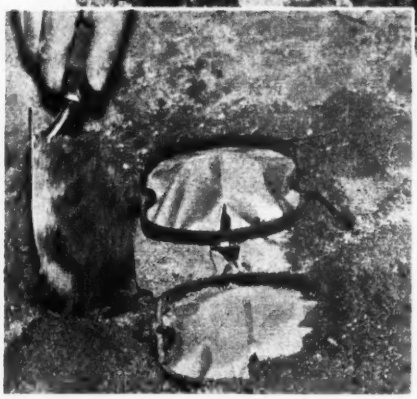
The trap's implacable steel jaws hold another bobcat that will kill no more livestock and poultry.

Left, a drag and chains from two traps are lowered into a hole where they'll be covered with dirt.

There is a different type of trapper, however, and though less romantic the work he does is more useful than merely covering milady's curves with ermine or sables. He is the "California State Trapper," whose job it is to control the predatory animals in the game refuges, and to see that the ranchers of the state can raise poultry and livestock without having all of their future steaks, chops and fryers disappear down the gullets of hungry bobcats or coyotes.

These fellows, instead of mushing great distances

Squares of waxed paper are slipped under jaws and over pan of trap, making close fit around trigger.



Filling in carefully with a trowel. Next, using a screened box, sand will be sifted over the traps.

over crunching snow to inspect their traplines, leave their homes in the city about the same time that you and I go to work. They sit back in the comparative luxury of a light delivery truck, and bounce and wind their way over the narrow by-roads that crisscross California's sagebrush covered hills. Most of their traps are set within 20 or 30 feet of the road, so that little time is lost in seeing if a catch has been made. Although this appears to be a leisurely way [*Continued on page* 88]

Last, on a cow chip or rock placed by the traps, are poured a few drops of a foul-smelling scent.

State trapper Adams looks over his day's catch.

If you're smart, careful and a mighty good mechanic you too can "soup-up" an automobile and become a "screaming" hot-rodder

Confessions of a

DRIVING a "hot rod" or "souped-up" car is a sport—cleanly competitive, law-abiding, and as reasonably safe as airplane, bike, or midget auto racing, boxing, football, or any other spine-tingling spectacle that thrills Americans in the country's arenas today.

That's my story and I'll stick to it.

I've been a hot-rod jockey for six years—started when I was 17—and in that time I've owned and raced 15 of them. My real work is acting and singing (in fact, I have to write this between rehearsals in New York for a tour in the USO Camp Shows' presentation of "Girl Crazy," to get it off my chest before I leave for the Pacific); but whatever spare time I've had I've spent building and driving the soup-ups, and so far I've had no serious accident.

But don't get me wrong. I'm not putting a halo over the heads of the whacked-up public enemies who careen hell-for-leather along the California highways, gleefully nudging passenger autos into ditches, busting all speed laws with mad abandon and thumbing their noses at the harassed cops they leave behind in clouds of high octane exhaust.

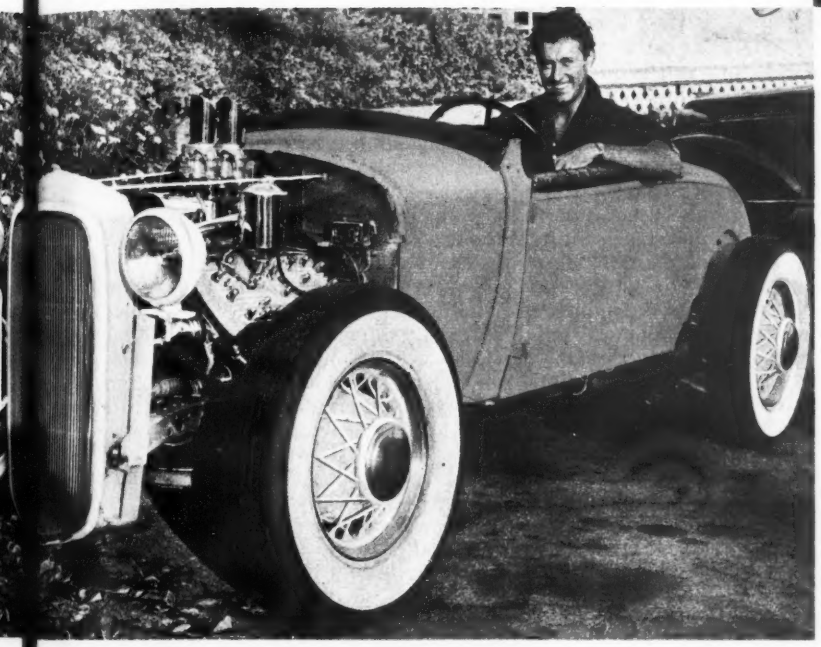
Those aren't my kind of guys. They're the outer fringe, disowned by the regulars; they have rightfully stirred the ire of the police and civic fathers.

All of us "legits" belong to one of more than 30 Roadster Clubs throughout California and, without exception, each or-

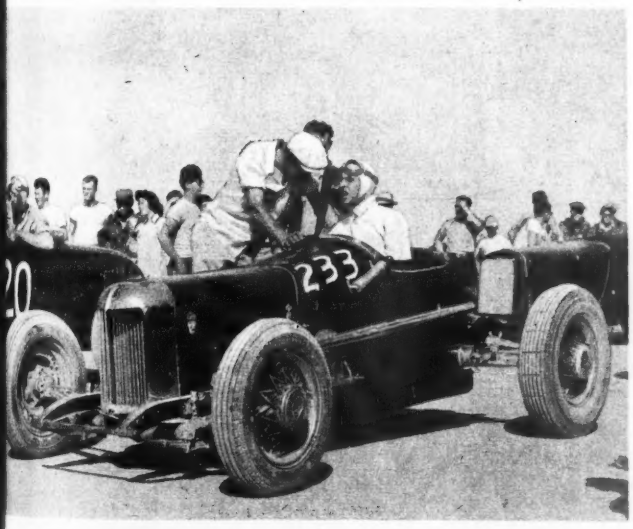
Don Blair in his supercharged Mercury V-8, which holds the Unlimited record of 134.08 mph average.

HOT-ROD Jockey

BY EARLE BRUCE
Amateur Champ



Above, Earle Bruce at the wheel of his streak of lightning. Doug Caruthers, shown below in his Modified, has turned in a top speed of 130.81 mph. Note the underslinging, which helps prevent spills.



ganization clamps down hard on all members who hold races on public highways or drive recklessly. Automatic expulsion is the penalty for all offenders.

The clubs have banded together and formed the Southern California Timing Association which sponsors speed tests over special courses and awards trophies and plaques to the fastest entries. The clubs observe all police regulations and race only in well-supervised meets.

There's a world of difference between the intricately-constructed, de-

pendable racers and the phony hot rods which zoom along the roads with little more than a prayer to insure the safety of the fellow behind the wheel. Right now we're going all-out to put pressure on owners and builders of these cars to install hydraulic brakes, good shock absorbers and all safety devices to comply with police regulations and incidentally keep the drivers' personal necks intact.

Take a long look at some of the better hot rods and you will find that they meet the most rigid specifications for automotive safety. And most of the jockeys are earnest young guys, some years out of school, who are constantly experimenting in instructive engineering research. They are not speed-crazy jerks; they are smart mechanics to whom some of the improvements now in effect on commercial passenger cars can be directly traced.

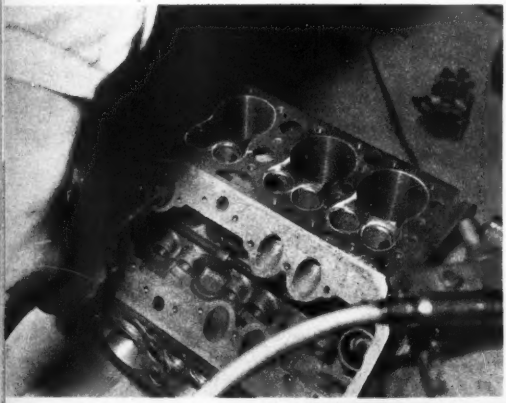
And now let me take you to a typical hot rod speed test.

This one will take place at El Mirage, a dry lake in the Mojave Desert 98 miles from Hollywood. Actual timing starts at daybreak on Sunday, but by Friday hundreds of hot rodders are already on hand, whizzing along the five-mile lake bed in tests for engine bugs. On Saturday S. C. T. A. officials inspect the course and select the longest stretch with the fewest rough spots as the scene of the big show. They post red flags at intervals along the best one-mile stretch and the stage is set.

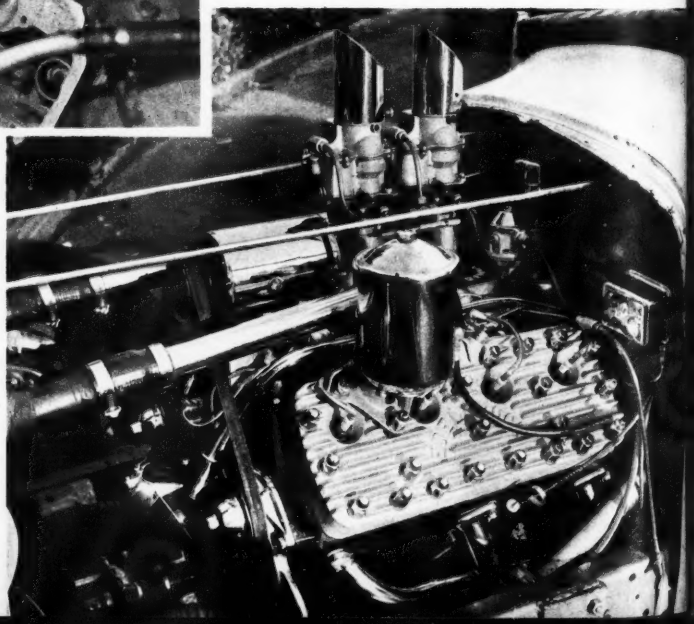
Comes dawn and more than 300 cars are in line. Thousands of spectators, rooters for the participants, rim the lake bed and stir with excitement as the first speedster rushes toward the straightaway. Timing begins when his front tires intercept the beam of an electric eye, and concludes when another eye a quarter-mile away automatically stops the timing apparatus. From the elapsed time over the measured distance the officials arrive at the speed in mph.

At the end of his run the driver makes a wide half-circle and comes back to the timing stand, where the judges hang a card with his time on the left door of his car. Back he goes, then, to the end of the line.

The first run is merely a test; on the second he must clock 115 mph to be eligible for a third. On the third he must hit 120, to remain, and so on, until the



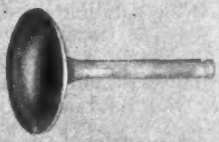
Grinding and polishing intake ports helps prevent air turbulence and speeds fuel induction.



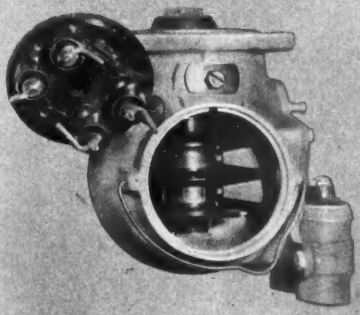
Engine of the Bruce car. Note its special heads and the intake manifold with twin carburetors.

Special lightweight aluminum flywheel allows faster pickup and greater top speed.

Hand type air-pressure pump with shutoff. Below, tulped valve with 30-degree seat.



Arrow shows where frame was cut and insert welded in, so as to lower the body frame.



Reworked Ford distributor and Zephyr rotors will give four-lobe breaker cam action. Axle bend, right, lowers frame two inches.

winners are determined in the various classes of cars competing.

Randy Shinn of the Pasadena "Road Runners" recently smashed the roadster class speed record with a beautiful 128.9 mph with his '32 V-8 Ford bearing a Mercury engine. That's mighty rapid going.

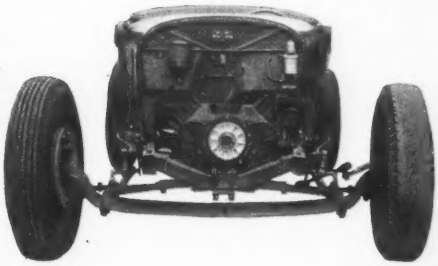
In the Modified car class, a record of 133.03, also set by a Mercury V-8, still stands. To quality as a Modified, a racer must have at least 400 square inches as a vertical plane in the back. A 1926 Chevrolet four-cylinder engine, mounting twin carburetors, holds the record in the Streamliner class with a blistering 140.00. And in the Unlimited class, in which any type of engine is permitted, the mark is held by a Mercury V-8 which hit 144.08.

Take it from me, it's not easy to build a car which can achieve these tremendous speeds. It takes many years of study, long hours of labor and lots of experimenting with fuels, gears, pistons, frames and what-not, not to mention heavy, repeated digging into one's personal bank account. You see, no one makes any money out of hot-rodding. It's strictly amateur, done for the fun of it, and the tab comes high.

A good fast hop-up costs roughly $1,500 to build, and some run as high as $3,000. The engine alone, according to the type and amount of equipment used, sets the driver back $850. The rest is used up in changes in stock frames, hydraulic brakes, painting, chroming and the like.

The souper-upper's job is broken down into three big categories: changes in his engine, changes in his frame, and selection of proper fuels.

On the engine, he's got to rebore his cylinders for additional piston displacement, port his block for greater fuel intake efficiency, regrind his cam shaft to alter valve timing and increase intake and exhaust duration, rebuild his ignition to insure the better [*Continued on page* 96]



coast guard lays a ghost

FOR years I have been fighting in a war that is won but never ended.

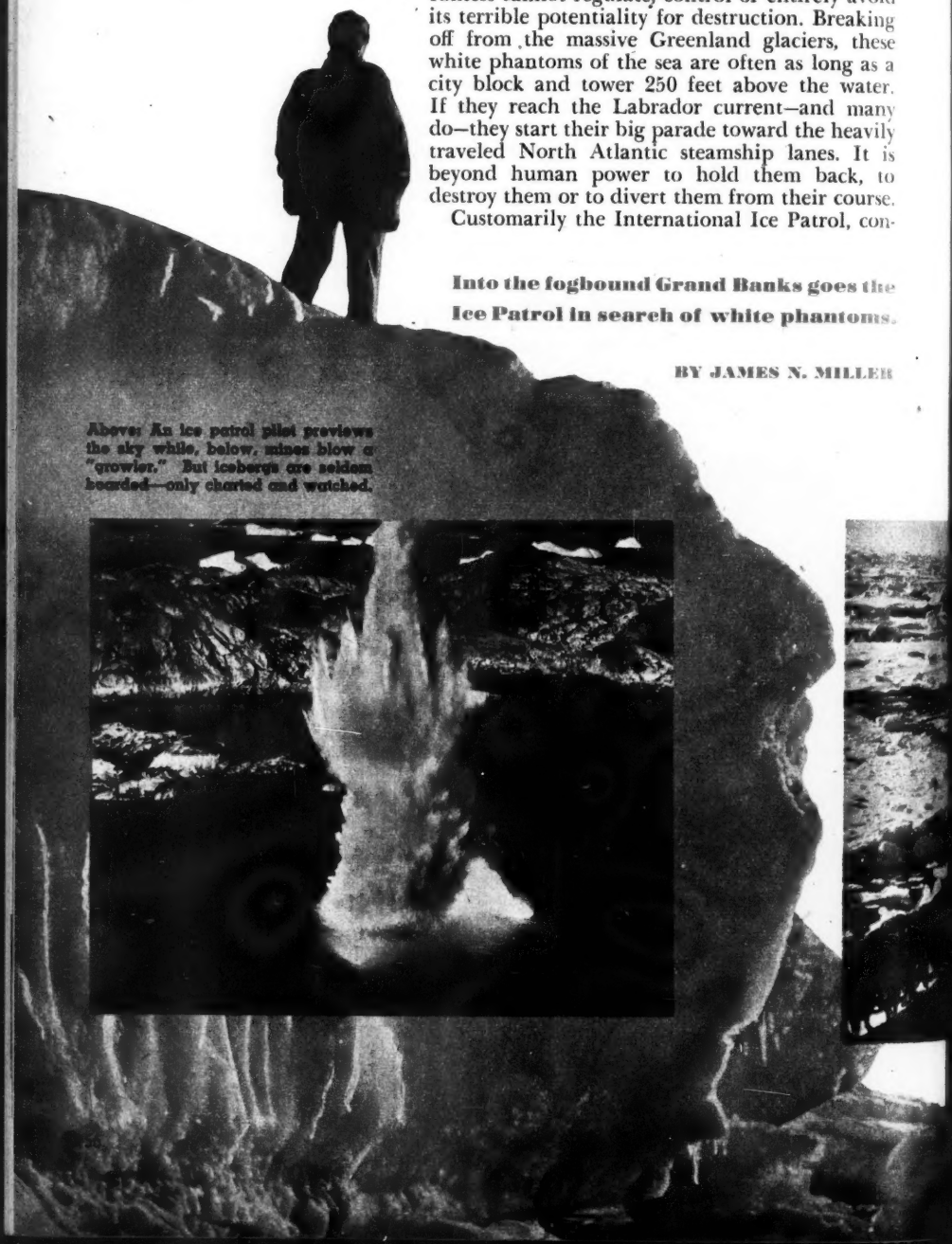
Always the foe is the same—those floating ice mountains which are constant threats to shipping along the northern sea lanes.

The iceberg is a menace of nature so powerful and big that man with all his vaunted resourcefulness cannot regulate, control or entirely avoid its terrible potentiality for destruction. Breaking off from the massive Greenland glaciers, these white phantoms of the sea are often as long as a city block and tower 250 feet above the water. If they reach the Labrador current—and many do—they start their big parade toward the heavily traveled North Atlantic steamship lanes. It is beyond human power to hold them back, to destroy them or to divert them from their course.

Customarily the International Ice Patrol, con-

Into the fogbound Grand Banks goes the Ice Patrol in search of white phantoms.

BY JAMES N. MILLER



Above: An ice patrol pilot previews the sky while, below, mines blow a "growler." But icebergs are seldom boarded—only charted and watched.

ducted by the U. S. Coast Guard, gets underway about March 1. The region patrolled, about the size of Pennsylvania, takes in the Grand Banks of Newfoundland and the area just south and east of it. During the ice season, extending from April to July, this region is blanketed in fog much of the time, accented by the meeting of the warm Gulf Stream and the icy Labrador current. Through this region passes the world's heaviest sea traffic.

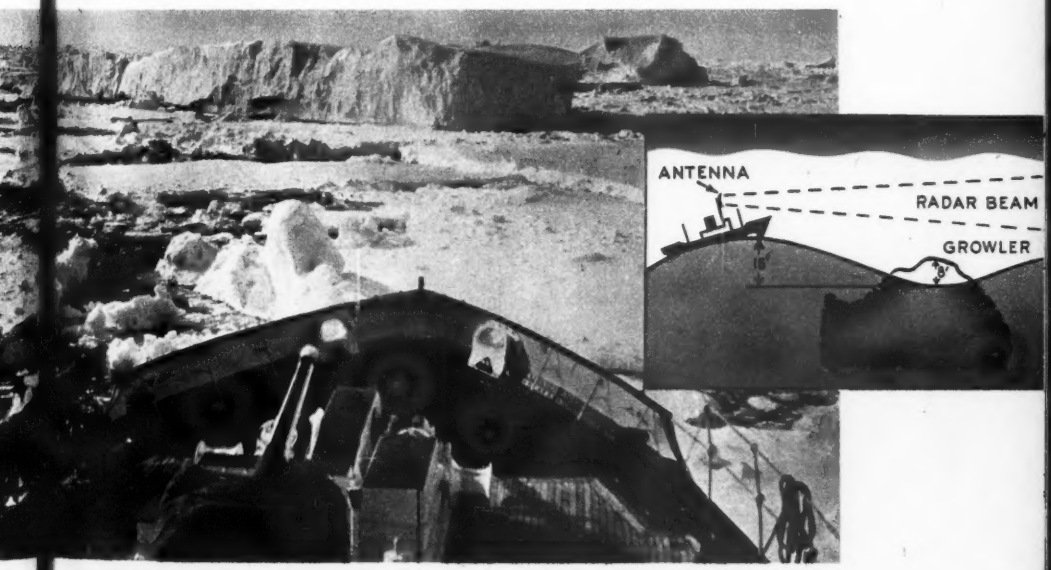
Aviation, radar and Loran are being employed this season for the first time to improve detection and location. Radar and Loran, however, are supplemental and are not a conclusive answer for ice surveys. It is therefore necessary to conduct a vigilant patrol with cutters and aircraft. Planes and ships are based at Argentia, Newfoundland, where the International Ice Patrol Commander and staff makes its headquarters.

Coast Guard-manned B-24's, supplemented by additional aircraft when required, are making aerial surveys. The three cutters which have resumed their former roles as iceberg spotters are the Tampa, the Modoc and the Mojave. Known as cruising cutters, these highly specialized craft have a displacement of 1,780 tons, a length of 240 feet, a 39-foot beam and are driven by turbine electric motive power.

With a top cruising radius of 5,600 miles, these vessels have a maximum speed of 15 knots. All three are hard-bitten veterans of the sub-hunting-patrols of the North Atlantic during the war. Both planes and ships will carry radar and Loran. Under the present plan two cutters remain on patrol while one is on a standby status.

How dangerous is the North Atlantic in the vicinity of the Grand Banks? Between 1862 and 1890, 14 vessels were lost and 40 seriously damaged in the area due to ice. Among these were many trans-Atlantic steamers that had collided with bergs. The list would undoubtedly be much longer if reports had been made of all commercial fishing vessels lost or damaged.

Up to 1912 there was no ice patrol, the reports of passing ships and of shore stations being handled by the U. S. Hydrographic Office. On April 14, 1912, the Titanic, westward bound on her maiden



Cutters ply the far north, charting icebergs before they reach the sea lanes. Radar is invaluable, but in rolling seas, it often misses targets (see drawing).

voyage to this country, struck an iceberg 75 miles south of the tail of the Grand Banks. She ripped a huge gash along one side below the waterline and sank in about two hours with the loss of over 1,500 persons.

A shocked public opinion demanded the setting up of safeguards to prevent similar disasters. Accordingly a continuous patrol was established during the berg season to keep track of the ice threatening the steamship lanes and to warn, by radio, the vessels approaching the danger zone.

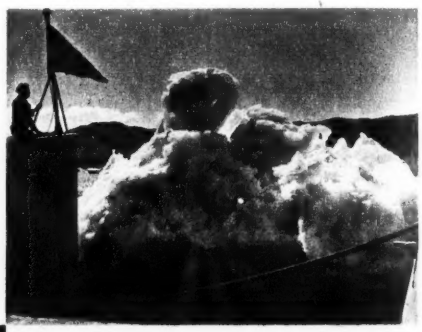
The U. S. Navy undertook the task, assigning two scout cruisers to patrol duty during the latter part of the 1912 ice season. From 1913 on the Coast Guard has carried on. Each year except during World Wars I and II the organization has stood a continuous guard over the southernmost ice each spring until it no longer threatened the steamer lanes south of, or crossing, the Grand Banks.

Full cost of maintaining the patrol vessels during the ice season has been distributed among more than a dozen maritime nations most directly concerned with North Atlantic shipping. Theoretically, each one contributes in proportion to the tonnage of its merchant fleet benefitting from the service.

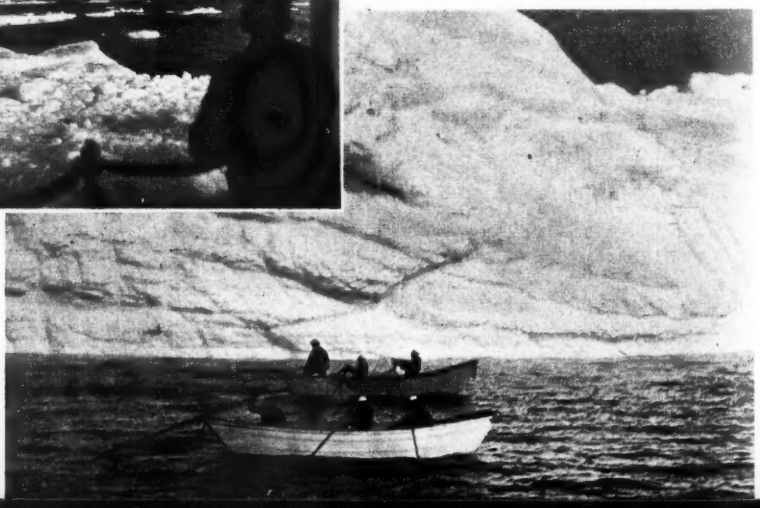
Procedure is now handled as follows: Ice and iceberg data is collected by the patrol vessels, from aerial surveys and from sightings reported by ships and planes. Commercial ships in the ice area have been asked to radio every four hours, their position, course, speed, weather, water temperature and a brief description of ice sighted. The ice information is summarized in radio dispatches which are broadcast twice daily.

The use of radar is a vast improvement. But unfortunately, present radar gear can overlook small floaters or growlers capable of doing extensive damage.

Loran affords a chance to check the exact locations of bergs after they are sighted. Often, in the past, patrol vessels have been fogbound for days. Their positions had to be figured by dead reckoning, soundings and radio direction finder bearings. Loran generally enables a vessel's position to be plotted within approximately [*Continued on page* 88]



Above: Beaten to a frosty pulp by a Coast Guard cutter, this berg is in the disintegration stage. Left: The patrolman's view, month after month—an ever-shifting pattern of ice. Below: Guardsmen take flight from a white monster.



Scientists Raid the Ocean Floor

Explorers now aim at the conquest of the sea floor, a great dim world of incredible riches.

A LOUD blare of confused noises breaks in upon the botanist's thoughts, distracting his attention from the bizarre plant he has been studying intently in the dimness of the sea bottom.

He sighs, and a thicker-than-usual flock of bubbles burbles up from the artificial "gills" which enable him to breathe his oxygen directly from the water.

Oh, for the calmness of the campus! he thinks. Back at the university science could be science and not just a bag of under-water tricks!

Then at once a voice sounds in his helmet. "Professor Jones, return to the station," it says. "Acknowledge."

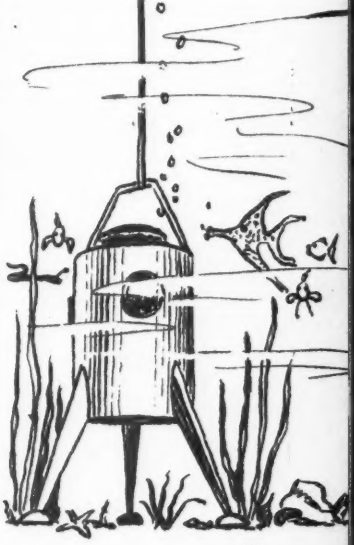
"Jones is returning to the station," the botanist says promptly into the mike of his helmet radio.

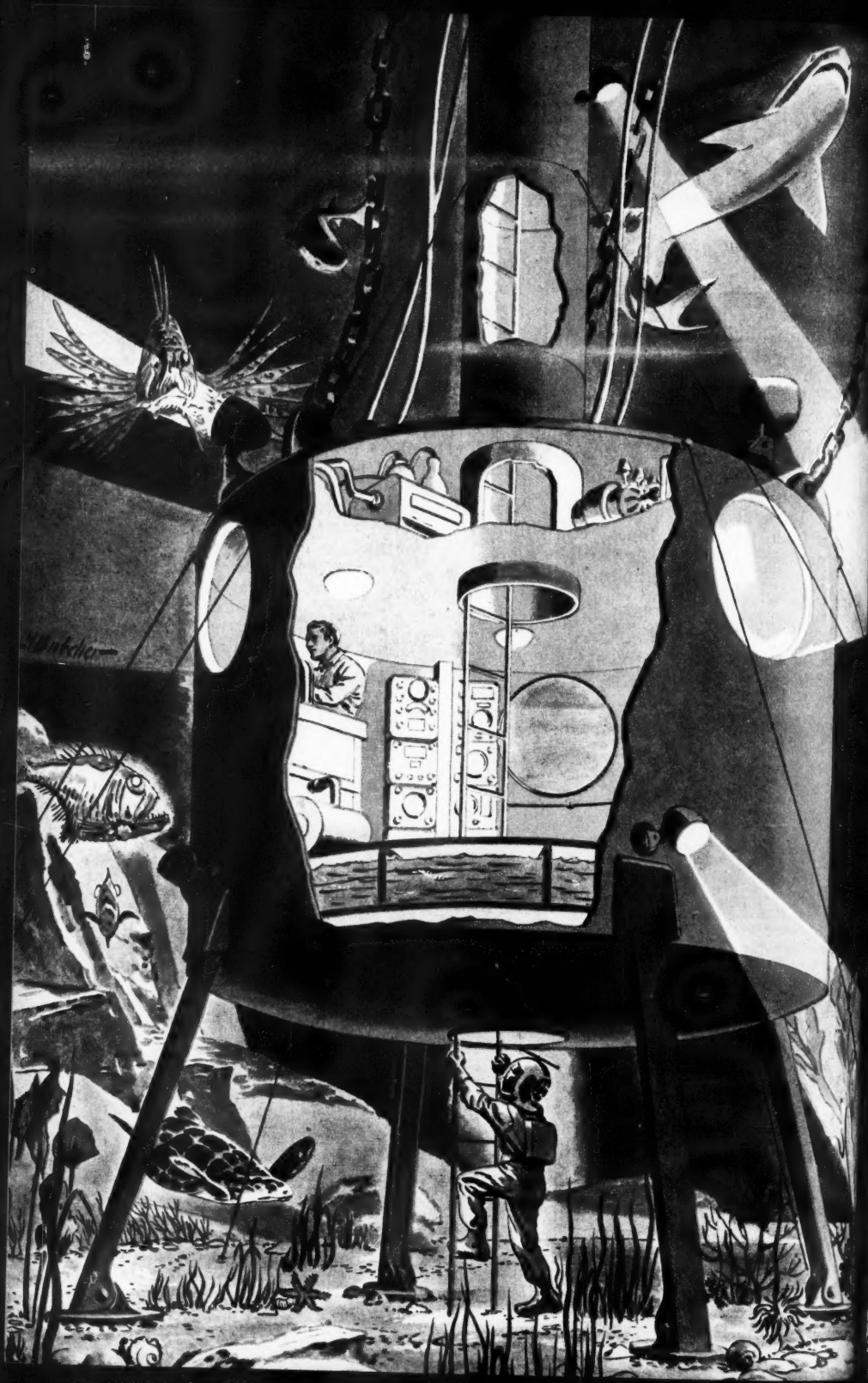
Several hundred feet away at the station—which is a movable under-water laboratory "house" then resting on the ocean floor—his associates catch his acknowledgement; and it is caught, too, by the tender on the mother ship on the surface, 125 feet above.

Resisting every floral temptation which comes to focus in the rays of his headlight, the professor slowly makes his way straight for the lights of the great laminated steel structure in which the entire research party has spent the last ten days. He enters at once, not having to wait to accustom his body to the lesser pressure because his breathing mask furnishes him an oxygen-helium atmosphere instead of an oxygen-nitrogen.

Inside, the technician in charge is talking over the telephone to the upper world. "Move us 150 yards north-northwest," he says. A calm voice answers over the loudspeaker housed in the roof of the laboratory, and slowly the lab begins to move through the dim waters.

There's danger on the ocean floor! A large shark swims menacingly above this diver at Marine Studios, Florida.





Thr
cont
wor
wate
glass
A
dow
ligh
crow
ing
the
"
east,
can
surfa
ship
slow
to re
rich
dials
the
over

Through a small window the man at the controls sees the light from the upper world streaming down through the dark water like sunlight through the stained-glass windows of a cathedral.

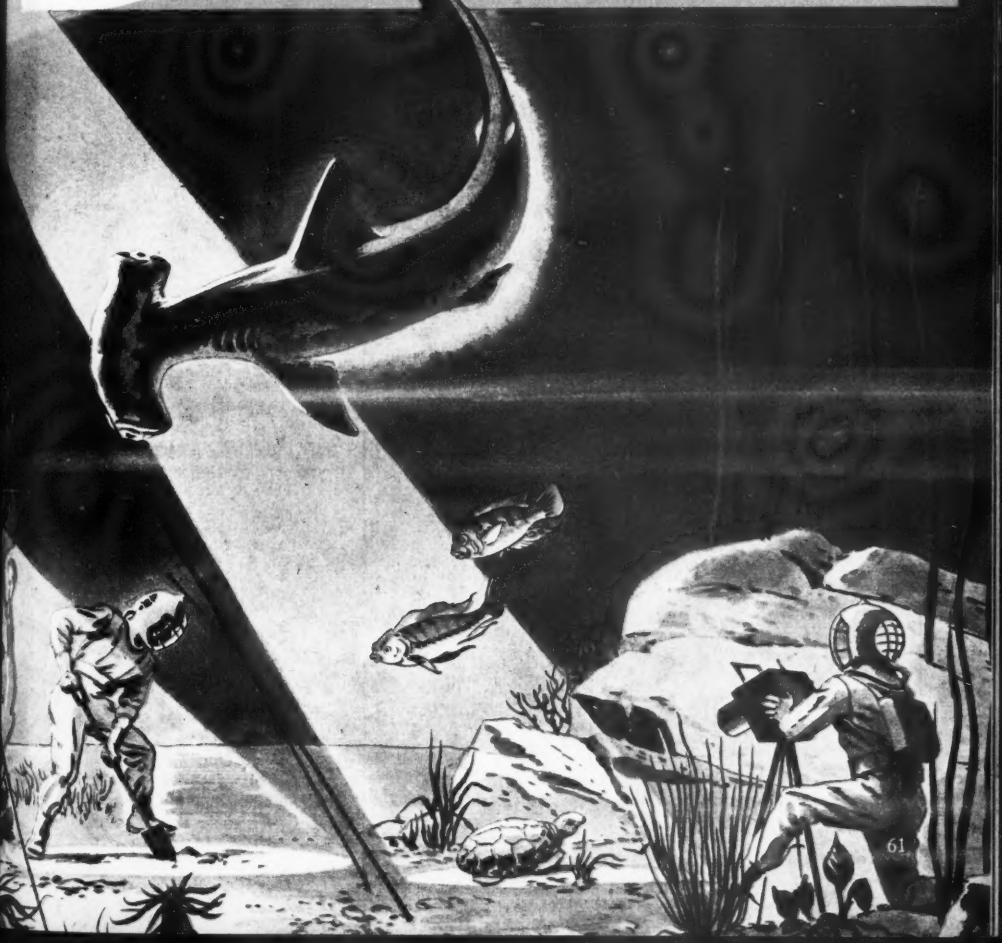
A third man, on watch at another window, flashes on one of the big searchlights attached outside—scattering a crowd of curious fish that have been gazing through the window at him. Slowly the "house" comes to a stop.

"Better move us 20 yards north-northeast," says the technician in charge. "I can see the edge of the abyss." On the surface, orders are barked, the mother ship swings, and the great house inches slowly sideways, then downward, coming to rest with its pronged legs stuck in the rich mud of the deep. A scientist at the dials of the undersea laboratory reads off the pressure. A voice from above comes over the loudspeaker.

"You are resting at 154 feet," it says.

There is sudden activity inside. One of the scientists starts checking the diving equipment and apparatus stored along one side of the house. Others take down readings from the dials and make observations through the four windows. The man at the phone relays the readings to the surface where a trained crew of technicians and scientists start checking and calculating. . . .

Artificial gills! Helium breathing! Undersea laboratories! Electric lighting, telephones, radio and walkie-talkies on the ocean floor! Some of these inventions already are at hand. Others are just around the corner—not far around it. Scientists are overcoming the final obstacles to opening up a whole rich new world—the world that lies deep below the surface of the waters.



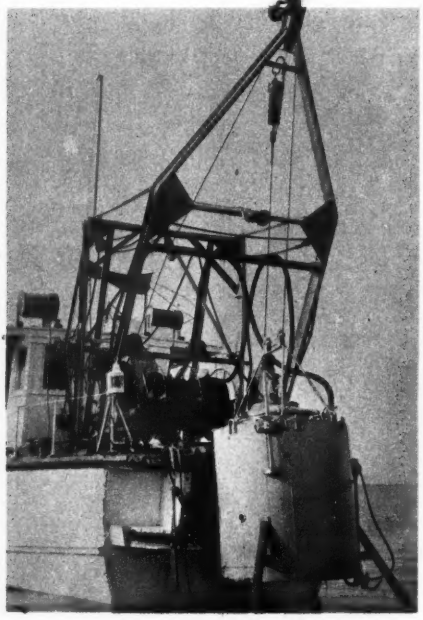
The above is no vague dream but the picture of an experiment in undersea living and research soon to be carried out. It will be the culmination of centuries of progress in underwater research.

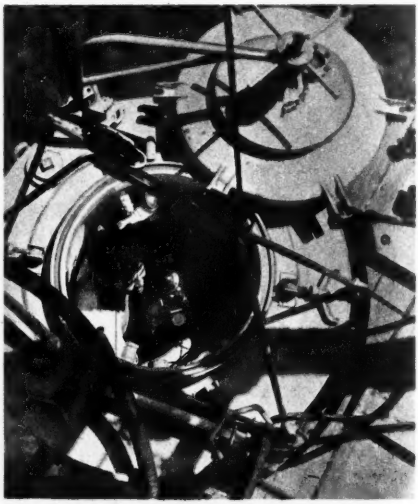
The United States government has for sometime been carrying out extensive hydrographic surveys to determine the contour of the undersea land. The charts resulting are now printed in booklets available to everyone, for industrial or private use—so you may build an undersea house somewhere off the Atlantic or Pacific coasts, or grow an undersea garden, or cultivate pearls, or sail under the surface, or dive just for pleasure.

Navy scientists and other research workers have perfected under-water sound systems which will enable us to locate survivors lost many thousands of miles at sea. Sound at a depth of 2,000 to 6,000 feet has such amazing propensities for travel that the water becomes a veritable speaking-tube. Tests conducted in the Bahamas during the war showing that survivors dropping a package of TNT timed to explode at 3,000-4,000 feet could produce a report audible in useful intensities 3,100 miles away. Three or more hydrophone stations, widely separated, could pick up the signal, obtain a "fix" and send out rescue planes immediately.

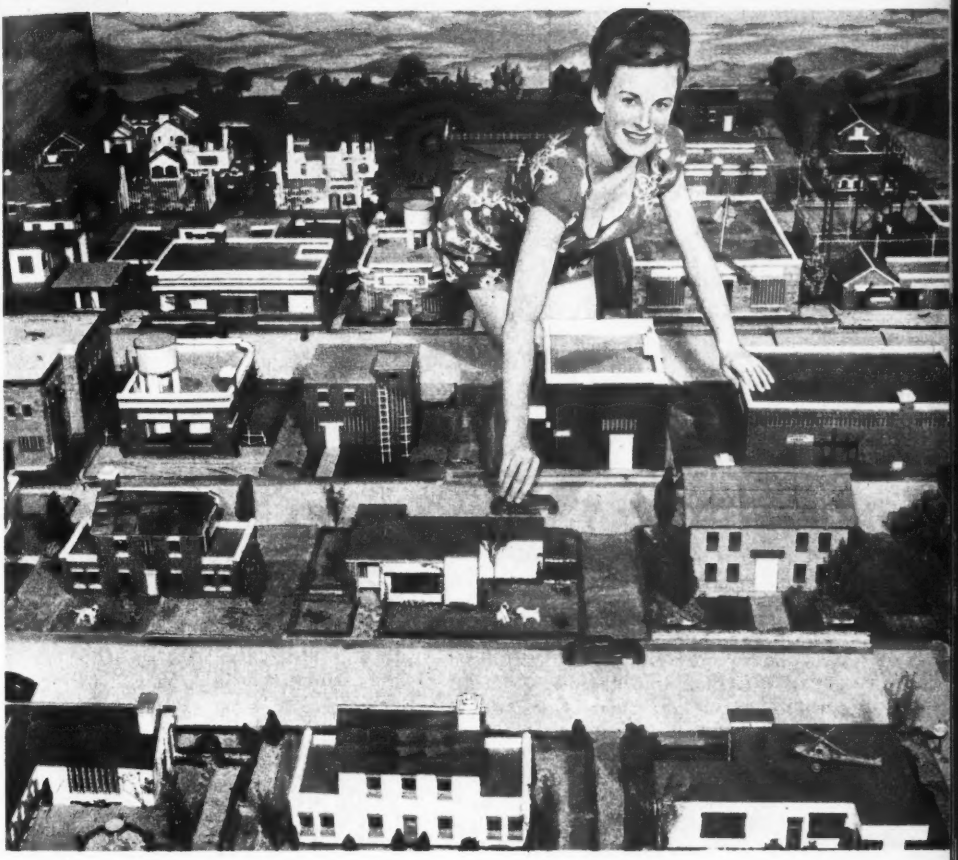
But probably the most important work has been in diving, resulting in the development of the under-water laboratory. These houses, now in the experimental stage, will be able to hold as many as a dozen occupants along with laboratory and sleeping facilities; and the next few years will see them attack deeper and deeper levels of the sea, where groups of trained scientists will study vegetable and animal life, discover minerals and sea wealth, and conduct undersea experiments. In the shoal depths these houses will be equipped with double-lock doors, so that the scientists can come and go as they please; and there will be other facilities to prevent bends, in addition to helium breathing.

Teams of diver-botanists and explorers will move from the laboratory into the dimness of the accessible sea-floor world with their cameras and equipment. The geologist will study at first hand the ocean bottom, a modern explorer dressed like a man from another planet. Physicians will test the reactions of men in such conditions, and others will advance still further the research which will make possible complete domination of the undersea. [*Continued on page* 90]





A two-ton diving chamber used in the search for oil. The gravity meter in front of the operator helps indicate its possible presence by mapping the geophysical formations beneath the surface.



design for living in miniature

BY DON ROMERO

Planning a new house? Town? School? Try it out first with made-to-scale plastic blocks!

THE building boom is on! Skyscrapers, air terminals, houses, churches—they're sprouting like mushrooms. Each one is made entirely of plastic and is complete to the last detail in one hour. You can put up a whole city in an evening. Your living room rug will make an excellent site.

Yes, everything's in miniature. But we're not talking about toys—though if you don't have fun becoming architect-engineer overnight, you're just an old scrooge and you can go sit in the corner and leer.

Made possible by tiny ingeniously designed pieces of building equipment and extremely simplified blueprints, these miniature buildings are intended as pre-views for anyone who wants to put up a building of practically any type. Architects can use them to show their clients exactly what their new homes are going to look like even before the ground is broken.

First, erect poles in the baseboard as the blueprint directs. Drop bricks on and walls begin to rise.

Below: Doors and windows fit into dowel holes. Roof beams rest on gutter-type bricks.

Home owners who want to renovate can make sure they are going to like the changes they intend to make. Industrialists can plan new factories, determining the exact location of machines and the amount of operating space that will be required by the workers. Housing organizations can design slum-clearance projects and model communities. Municipal governments can organize the construction of public buildings and work out questions of zoning, traffic, and similar community problems.

Manufactured by the Du Page Plastics Company, of Chicago, the equipment for these miniature structures is put out in 10 different sized building sets ranging in price from $4 to $27.50, and having anywhere from 400 to 3,500 pieces. Each set carries a number of simplified building plans from which it is possible to build, from even the smallest set, as many as three or four different kinds of homes, and from the larger sets, as many as 20 different types of buildings.

The truly great value of these sets, however, is that instead of rigidly following the building plans in every detail, a builder can give free rein to his fancy, and can at any time change or improve on the plans in any way that he sees fit. Or if he wants to, he can go the whole hog, abandon the plans entirely, and just let his own imagination dictate precisely the kind of building he is going to construct. If he does this, it is estimated that from one of the larger sets, a builder can turn as many as 100 different structures of every shape, form, and size.

In setting out to put up a miniature building, the builder starts with a composition base-board which is perforated with tiny holes set fairly close together. Into these holes he inserts a number of slender wooden poles, using taller poles where he wants a wall to be high, shorter poles where the wall is to be low, and leaving spaces between them where he eventually intends to place his windows and doors. Using tiny vinylite plastic bricks, each having two holes, the builder can begin his walls. Merely by sliding one brick down on top of an-

Above: Junior exhibits his modern gas station—and a proud grin.

Right: Family studies the future home, complete with landscaping.

other, he can quickly raise a wall to any height he desires.

By means of small dowels which can be inserted into bricks expressly designed for the purpose, the builder can attach his doors, steps, window boxes, chimneys, shutters, and windows—the latter being composed of bricks made of clear transparent plastic. To erect a conventional slanting roof, the builder uses tiny ceiling beams, the lower ends of which are held in position by means of flat "gutter-type" bricks which are placed at the tops of the walls and which have small slots into which the beam-ends fit. To secure the beams at their apex, the builder uses a ridge pole. From here the builder can quickly proceed to affix his shingles, which are held in place by notches in the ceiling beams, and presto—another miniature house is built.

But even then his home isn't finished, for no home is complete until the grounds have been properly landscaped. For this purpose each building set carries a small instruction booklet which shows how any number of odds and ends can be used to landscape a miniature plot. For instance, a piece of old toweling, dyed green and mowed with a pair of scissors to give it that neat, close-cropped look, makes a handsome lawn.

Pieces of old sponge rubber, also dyed green, can easily be shaped with scissors into trim-looking hedges and shrubbery. Toothpicks wired or glued together make excellent lattice work for the garden or for a grape arbor. A strip of coarse sandpaper makes a realistic gravel walk. A concave button yanked off last year's overcoat can be painted and then mounted on a tiny round stick to make a convincing birdbath. Small, irregular, flat stones can be delicately stained and jig-sawed together for attractive flagstone paths.

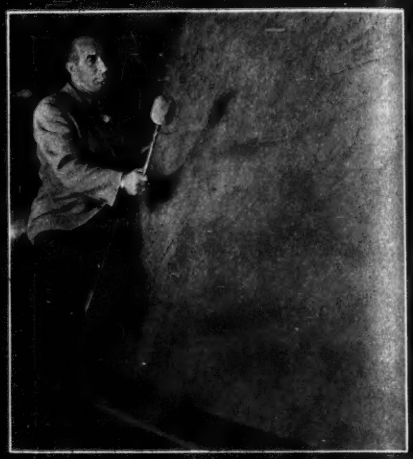
Twigs, weeds, and dyed wood shavings glued together make fine trees. A few stones, pebbles, and moss around a small mirror, and your miniature house boasts a rock garden with a tiny pool. And finally, after you've had a good view of what your home is going to look like in the summer, you can spray the whole thing with soap flakes and artificial snow to see just what it is going to look like in the winter.

From these building sets almost any type of private home can be constructed —a summer Cape-Cod home, a conventional one or two-story house, a home designed for the city, or an ultra-modern country home with curved glass walls and a top-floor solarium. Model railroaders can have a field day, too.

you can't believe your ears

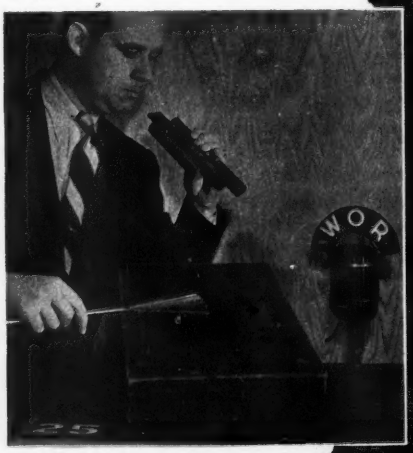
If you don't think the radio sound man has a job, just have a look here.

Photos by Sid Latham



When the sound man needs the crash of thunder he beats this big sheet of metal. Disillusioned?

When these siphon bottles, above, go squirt, squirt, listeners swear it's milking time in the cow barn. Below: Stroke a metal box with a drummer's brush and presto, it's a locomotive.



Below: That's the hero of the serial cutting his way through the dense, danger-filled jungle.

SOUND effects are the scenery of radio and have become a science in themselves.

In fact they fill a more important role in radio than do sets upon the stage, for they indicate action of every type as well as set scenes and moods.

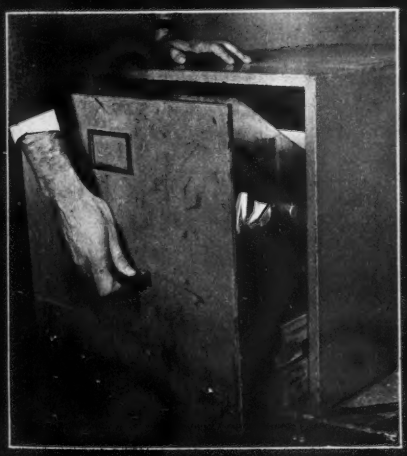
The sound effects man on the modern radio station has a fulltime job. Sounds must be simulated which give the maximum of life to the show and make it live for the listeners. He must study the script and become familiar with the action of the plot and the movements called for. Then comes the job of creating sounds in the studio which convey definite meanings.

Even the playing of the "canned"

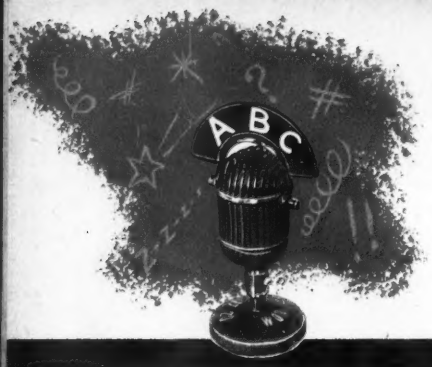
What the dickens he's pressing his fingers in — a box of corn starch. Footsteps in the snow!

You'd never guess this one. Suspended wooden blocks dropped in cadence are soldiers marching.

When they roll out the marble slab to identify the body, it's just this old file drawer, below.



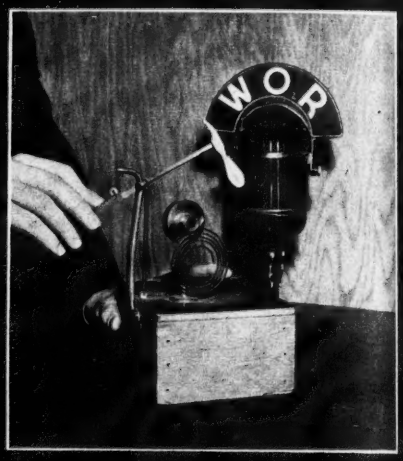
Frank Loughran, below, gets NBC's stagecoach ready to roll into Carson City. Giddap, Nell!



sound isn't just like throwing a Harry James record on the portable and turning the switch. Sounds have to make their appearance right on the second to be effective. The handling of recorded sounds takes a great deal of experience and technical knowledge.

In the sound effects department you can find everything from rubber balls, peanuts and small ply-wood cartons to highly expen-

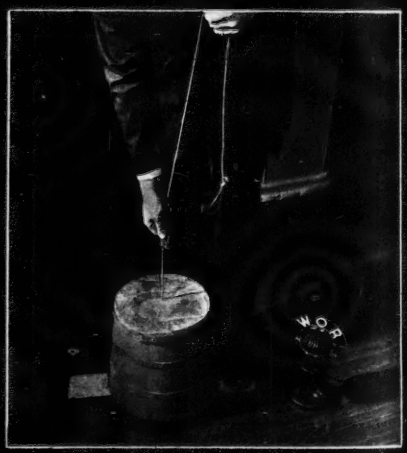
Above: He shoves the sliding door and opens a valve on the air it's a subway door closing.



This little clock gong, placed on a resonance chamber, is Big Ben sounding across the Thames.

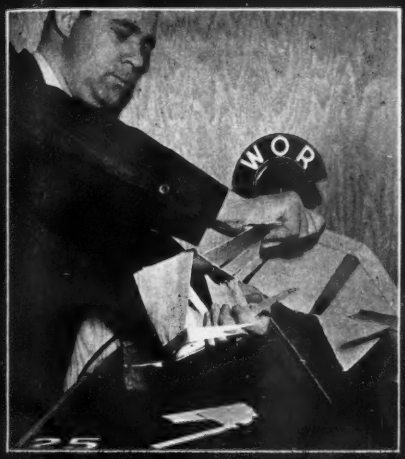
Fire rages beyond control. Will little Willowby be rescued? For this effect: a bundle of straw.

For a lion's roar, all that's needed is an oak bucket, a length of cord and a piece of resin.



sive electronic equipment, such as is used in the amplification or distortion of sounds or voices. In fact, one of the most used pieces of equipment, and one which a studio would find it difficult to exist without, is the unassuming little ply-wood carton, which can be used to give the effect of anything from the crushing of a man's skull to the breaking of a door with a fireman's axe.

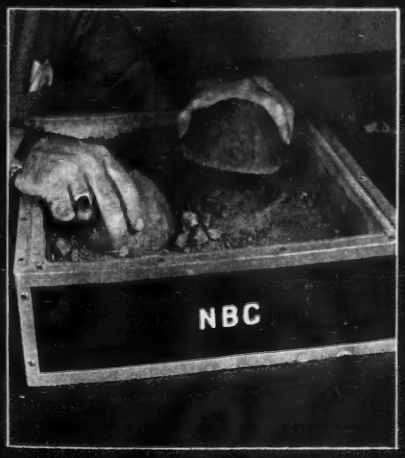
Probably the most called-for effect in scripts is that of a door, for this sound indicates coming and going as well as other movement within a house, office, or any other place where the action may be laid. And there are thousands of other effects in the department of a large radio studio.



This harmless bit of destruction, above, can be a door crashing or a man's neck being broken.

If you have a marble-top table, run a knife and fork across it sounds just like ice skating.

Below: You've guessed this one. Those coconut shells make the clip-clop of old Dobbin's trot.



Below: This was a tough one a tussle with a whopping fish took an electric motor and reel.

MI Tests the JEEP *Station Wagon*

MI's auto expert Tom McCahill gives this jeep his once-over.

Fields? It takes 'em in its stride.

IN THE last 20 years, what we call the station wagon or suburban has undergone many changes and refinements, some good, some bad. The former country, all-purpose jitney has slowly become a symbol of social success. It was designed originally as a truck, to be used by Gentlemen Farmers and sportsmen by day, and at night for social functions around the countryside. In the 1930's some of the more casual or nonchalant Playboy Farmers started driving them to New York and, before long, the famed Stork Club and El Morocco came to look more like service stations for station wagons than night clubs, and this, my friends, is how the once country-bred, all-purpose car, became citified and no longer too practical. Few would think of using one of these highly-varnished, chrome-heavy gems with red morroco upholstery, in some cases stuffily known as Estate Wagons, for hauling pigs or goats.

Willys Overland, makers of the famed Army jeep, have now reintroduced the station wagon as it should be with an all-metal offering, and it should prove as popular with the pigs and semi-heavy farm work as it will with some Hollywood starlet. To test this new car, I took one for several days and practically beat its brains out on a hunting trip last fall. Loaded with equipment, I went through fields and marshes where no self-respecting four-wheeled vehicle should ever travel without a bulldozer handy to pull it out.

Before I had gotten out of New York on this trip, I was impressed with the interior room and—hold your hats, G.I.'s!—the riding qualities. The jeep station wagon is a far cry from the back-breaker and bottom-buster the boys got to know so well in the service. In fact, it rides every bit as well as any American sedan in the low-priced field today. I was impressed, too, with the excellent quality and workmanship that went into the body, because unlike many of our cars this year, the

body is extremely quiet. A lot of body noise of late has been caused by window rattling because the manufacturers have been unable to get heavy felt for the window tracks, and this has also caused a lot of window-cracking when doors are slammed. The jeep station wagon comes equipped with ample felt around the windows and even when I was driving across rough, open fields at thirty or forty there wasn't a rattle.

Performance, however, is what I was particularly interested in and I must report, everything considered, it's top flight. The power plant is the famed jeep battle engine of world-wide renown and its ruggedness and dependability are beyond question. As most of you know, this is a four-cylinder engine, economical to operate, and repair bills should prove very light in comparison to other cars. The conventional four-wheel jeep drive has been dropped from the station wagon, leaving it with the conventional two-wheel rear drive. The former feature proved more than practical in pulling through mud, snow or sand, but with few exceptions it should hardly prove essential any more and I feel it was smart to discard it, for it eliminates additional weight and a high percentage of friction drag.

Here's a station wagon that can really be put to work. Look at that big open back!

The jeep station wagon is ready for everything—work or play—farm, field or road. Note flat-topped fenders and visibility.

The station wagon comes equipped with an overdrive that is semi-automatic in action, similar to the way some popular automatic gear shifts operate. This means that with overdrive you have the equivalent of a four-speed car. The action between the two top gears is controlled by accelerator pedal pressure. When the overdrive unit is in operation and you have shifted into high gear manually, you can, after reaching a speed of thirty miles an hour, drop into a higher gear by releasing pressure on the accelerator pedal momentarily. Once in overdrive a lower pick-up or hill-climbing gear can be brought into play by putting the gas pedal flat to the floor. The jeep station wagon has plenty of snap and punch for whipping away on a green light, though its top speed is only about 65.

I drove the one I tested close to 300 miles, and I found that though it affords amazing comfort and flexibility, it is not a car I would want to drive on a three-day trip. Of course it was never designed for such use. It was designed primarily for trips up to 200 miles a day, and for an all-purpose car that can be used for work or hauling your 12 kids to school. The wheelbase of 104 inches has 24 inches on the regular jeep and this additional length is partly responsible for the new-found riding comfort.

After leaving New York I headed for my place in the country, just 105 miles away. I was naturally interested in what sort of time I could make, because I make this run in my own car several times a week and usually [*Continued on page* 90]

night into day

With the activation of gases in the Ionosphere, we'll have eternal day.

BY JOHN C. ADLER

A NEW radiance may soon pour down from the night sky, dispelling the darkness and changing the life of mankind in the future. This light, the brilliant glow of activated gases in the Ionosphere, is now a definite scientific possibility.

Professor Etienne Vassy, Maitre de Conference of the Faculty of Sciences, Sorbonne University, Paris, has set imaginations soaring with his new theory. He proposes to shoot a power ray 50 miles into the air, up into the thin gases of the Ionosphere, activating these gases and causing them to glow with a neon-like light. An artist's conception of this effect upon the business section of New York City is shown in the accompanying photograph. In this island of light,

Left: Dr. Kaplan reproduces the weird glow of the aurora borealis. Above: New York as it would look lighted from the Ionosphere.

people could work without artificial illumination.

The basis of this theory is sound. The strange colorful glow of the Aurora Borealis, and of the dimmer lights which astronomers find faintly shining in the heavens between the stars, and which they call "the background light of the sky," have been duplicated by Dr. Joseph Kaplan in his Los Angeles laboratory. Dr. Kaplan has gained this effect using only the rarer gases which constitute the higher layers of the air.

Further research, however, is

Right: Prof. Etienne Vassy, Sorbonne University, Paris, who set imaginations soaring when he pronounced the theory that may change future life.

necessary to learn the best type of ray to shoot into the air, how much radiation is necessary, and the best technique of directing from any earth point a beam of this activating radiant energy. When these problems are solved, an illuminated canopy will be created by the activated gases, directed over a defined area that will cover it with a soft sweet light.

How far has science gone towards these solutions? The tests which the Army is conducting in New Mexico, shooting the V-2 rockets one hundred and more miles into the air, will give part of the answer. They will tell how much radiant energy of the sun is [*Continued on page* 88]

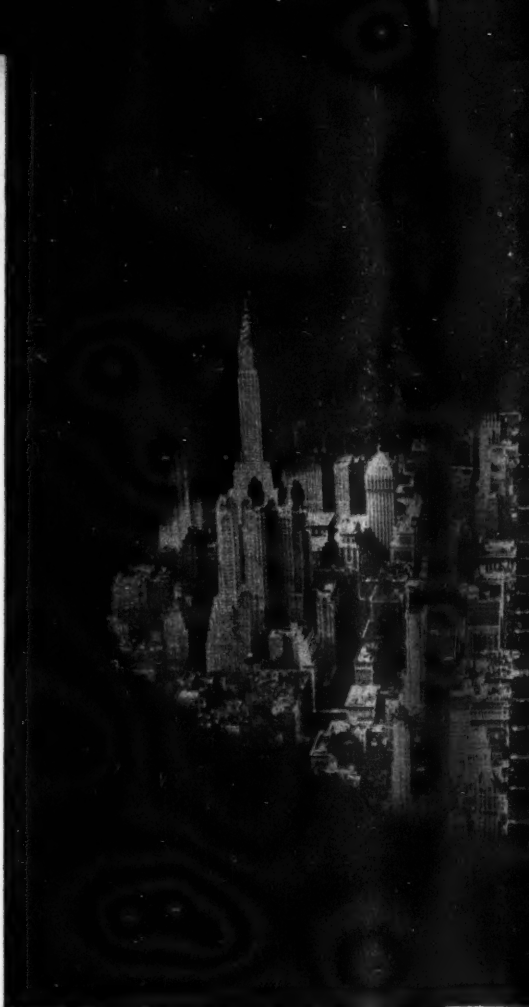
night into day

With the activation of gases in the Ionosphere, we'll have eternal day.

BY JOHN C. ADLER

A NEW radiance may soon pour down from the night sky, dispelling the darkness and changing the life of mankind in the future. This light, the brilliant glow of activated gases in the Ionosphere, is now a definite scientific possibility.

Professor Etienne Vassy, Maitre de Conference of the Faculty of Sciences, Sorbonne University, Paris, has set imaginations soaring with his new theory. He proposes to shoot a power ray 50 miles into the air, up into the thin gases of the Ionosphere, activating these gases and causing them to glow with a neon-like light. An artist's conception of this effect upon the business section of New York City is shown in the accompanying photograph. In this island of light,

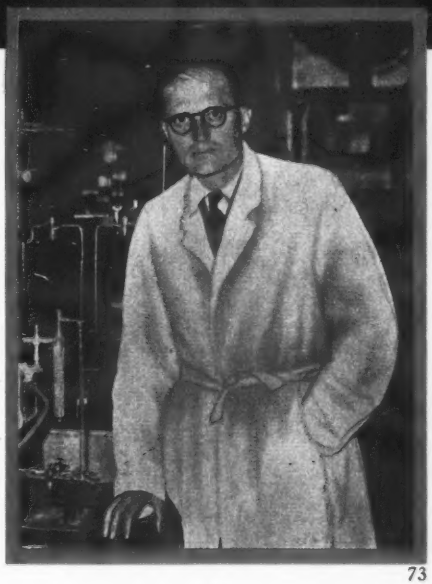


Left: Dr. Kaplan reproduces the weird glow of the aurora borealis. Above: New York as it would look lighted from the Ionosphere.

people could work without artificial illumination.

The basis of this theory is sound. The strange colorful glow of the Aurora Borealis, and of the dimmer lights which astronomers find faintly shining in the heavens between the stars, and which they call "the background light of the sky," have been duplicated by Dr. Joseph Kaplan in his Los Angeles laboratory. Dr. Kaplan has gained this effect using only the rarer gases which constitute the higher layers of the air.

Further research, however, is



Right: Prof. Etienne Vassy, Sorbonne University, Paris, who set imaginations soaring when he pronounced the theory that may change future life.

necessary to learn the best type of ray to shoot into the air, how much radiation is necessary, and the best technique of directing from any earth point a beam of this activating radiant energy. When these problems are solved, an illuminated canopy will be created by the activated gases, directed over a defined area that will cover it with a soft sweet light.

How far has science gone towards these solutions? The tests which the Army is conducting in New Mexico, shooting the V-2 rockets one hundred and more miles into the air, will give part of the answer. They will tell how much radiant energy of the sun is [*Continued on page* 88]

All-electronic color television has been achieved no rotating disks, no flicker. You'll be seeing it!

BY GOLD V. SANDERS

THE magic of the electron tube has been tapped again by modern Aladdins at RCA laboratories, and out comes television in color. It is all-electronic color, for the first time; no mechanical whirling gadgets to "mix" the colors. The studio scene is broken up into the three primary colors of light, red, blue and green. The signal—which means the picture—is transmitted through the air in three separate channels. At the receiving end the three incoming pictures are thrown simultaneously on a screen, producing full color again.

Since the rotating disks previously used to mix colors in television are absent in the new method, there is entire absence of flicker on the receiving screen. A technicolor moving picture was broadcast in a demonstration at the RCA laboratories at Princeton, N. J., and the invited reviewers were able to see it reproduced in the original colors on a screen 15 by 20 inches.

Signals corresponding to red, blue and green are picked up on three kinescopes within the receiver and projected on a 15 x 20-inch screen. Seen at left is RCA's new color slide television camera.

Brig. Gen. David Sarnoff, president of RCA, has pronounced this new achievement of his engineers, "one of the greatest steps in the whole of radio science." At the same time he cautions against public expectation of full color television very soon. It will be four years before it can be put into full commercial use, he says. Though the major scientific problems have been solved, it will require that much time to develop and produce all the equipment needed for full scale operation.

The most immediate advantage of the new invention is this: present-day black and white

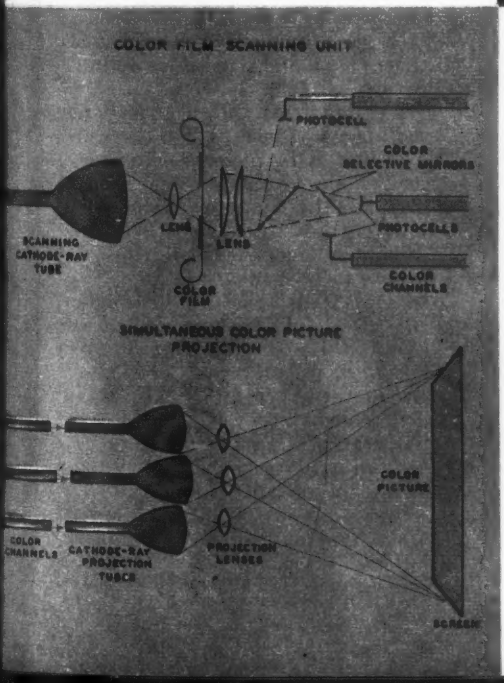
Color Television Comes True

equipment may be developed and expanded fully without fear of obsolescence. This is because the receivers now in use can also be employed to receive all-electronic color broadcasts—but only in black and white. The green signal of the RCA type of color transmission reproduces as black and white on these sets when they are equipped with a relatively cheap frequency converter.

This would be like a color-blind person viewing a Technicolor movie. He would get perfectly satisfactory entertainment, even though he could not see the colors the others were seeing. But in order to receive full color television, when it is available, owners of these black and white receivers will have to buy new sets.

The RCA color system employs three filters to separate the primary colors of the image to be broadcast, just as is done with mechanical color broadcasting. The green filter passes only those parts of the picture that have green in them, and the red and blue filters do similarly for red and blue. Since all colors are made up of these three primary colors of light, all visible colors can be broadcast and received.

Inside the RCA receiver. At center bottom sits the "Trinoscope" projection assembly.



Where the RCA method departs entirely from others is in the broadcasting technique. Three separate frequencies are employed, one for each of the three primary colors. The moving picture, studio play, or whatever image is to be transmitted, is broken up into these three parts by a system of color-selecting mirrors and photocells that convert it to electric impulses.

In the receiver, three kinescope tubes pick up the three individual color signals, all of which arrive on time, perfectly synchronized. Cathode ray projection tubes project all of them on the receiving screen through three lenses, forming the complete image.

cigarette-case camera

BY MAX SPITALNY

YOU'VE said a hundred times, "Oh if I only had a camera with me!" Raymond La Rose, veteran Hollywood cameraman and incurable inventor, said it too. He said it often. He said it so often he got tired of saying it: he got busy. He ended by turning out a snapshot camera hardly larger than a cigarette case—so small one can carry it ready but unnoticed in the pocket at all times, and so well designed that it takes excellent pictures.

It's small and it's nifty. Enlargements—bigger than the camera—are sharp. Mechanism is simple. Strip of 24 frames loads in daylight. Movie starlet Diana Lynn smiles her approval.

He uses a fixed-focus lens, a copy of the Grubb idea, made of modern glass specially ground by modern techniques to his own specifications. The lens is color corrected and highly sensitive. Each one is minutely adjusted to the camera it's used in, to insure optimum focus.

The Micro 16 uses a 16-mm. film cartridge of 12 or 24 frames, which gives that many pictures. Loading is easily done in the daylight by just dropping the film cartridge into its well.

Sharp enlargements up to 2½ by 3¼ inches can be made.

People who own this little fellow will miss few unexpected picture opportunities—because they'll very likely have it with them. They'll have it with them because it takes up so little room.

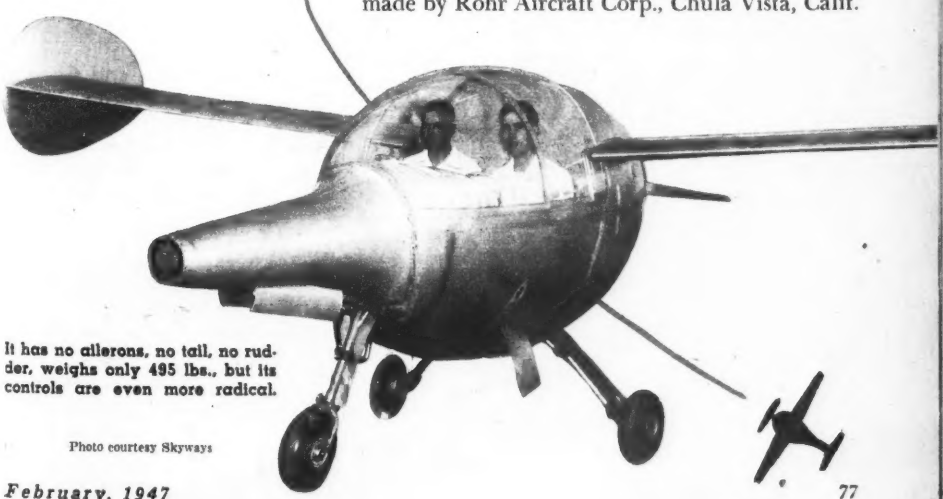
Operation is simple and quick. You just aim it at your scene, without any need at all for fancy tinkering.

La Rose is an old hand at special camera development.

lightplane by rohr

It may fly backward like the famous wahoo bird, but its inventors claim the MO-1 is a feat of engineering genius.

NO, THE artist hasn't gone crazy. That plane is really coming toward us. The tail—better call it the elevator—is in front. The buried power plant not only turns the pusher prop, but provides air for something really radical—the bellows-type control system. (Wingtip plates do not move.) A constant flow of air goes to full-span slots at the 80% cord line in the wings. In a left turn, the flow is decreased to the left wing and increased to the right. Elevator, likewise. Result: maximum theoretical lift coefficient. Called the MO-1, it's made by Rohr Aircraft Corp., Chula Vista, Calif.



It has no ailerons, no tail, no rudder, weighs only 495 lbs., but its controls are even more radical.

Photo courtesy Skyways

The radio sonde, which rides suspended from the weather balloon and sends back continuous data.

At 93,000 feet the synthetic rubber of the balloon will allow it to expand to four times this diameter.

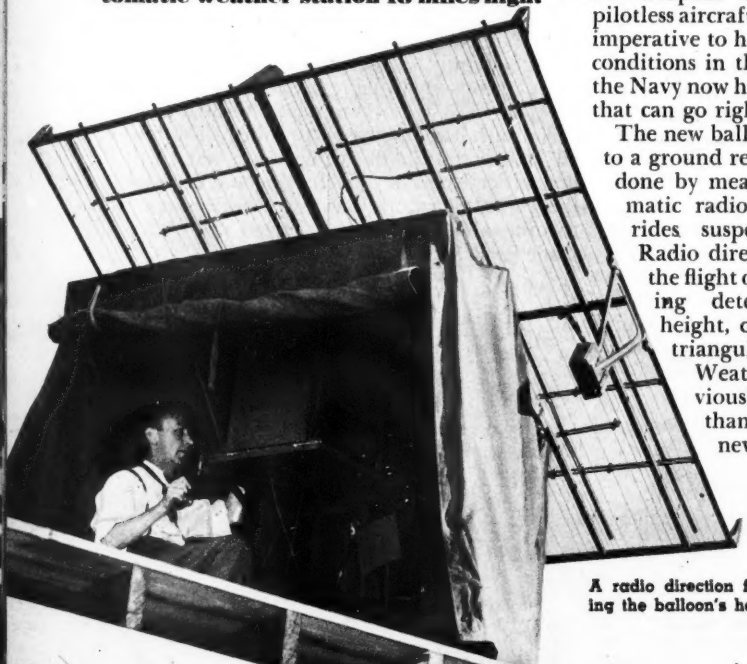
stratosphere weather station

The Navy's new balloon acts as an automatic weather station 18 miles high.

RECENT development of such weapons as guided missiles, pilotless aircraft and rockets make it imperative to have data on weather conditions in the stratosphere, and the Navy now has a weather balloon that can go right up and get it.

The new balloon sends back data to a ground receiver as it flies. It's done by means of a small automatic radio transmitter which rides suspended underneath. Radio direction finders follow the flight of the balloon, allowing determination of its height, course and speed by triangulation.

Weather balloons previously used averaged less than 40,000 feet. The new one reaches 93,000.



A radio direction finder used in determining the balloon's height, course and speed.

Your Plane Can *Talk*

By ED YULKE

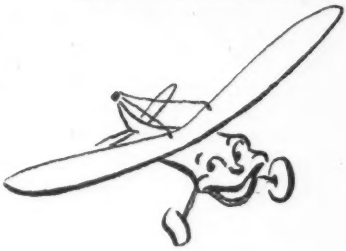
Here's the dope on a number of new two-way radios for your lightplane—all surprisingly light and small and versatile.

The instrument panel mounting of Airadio's Two-Way Communications set, above, is hardly larger than a penny postcard.

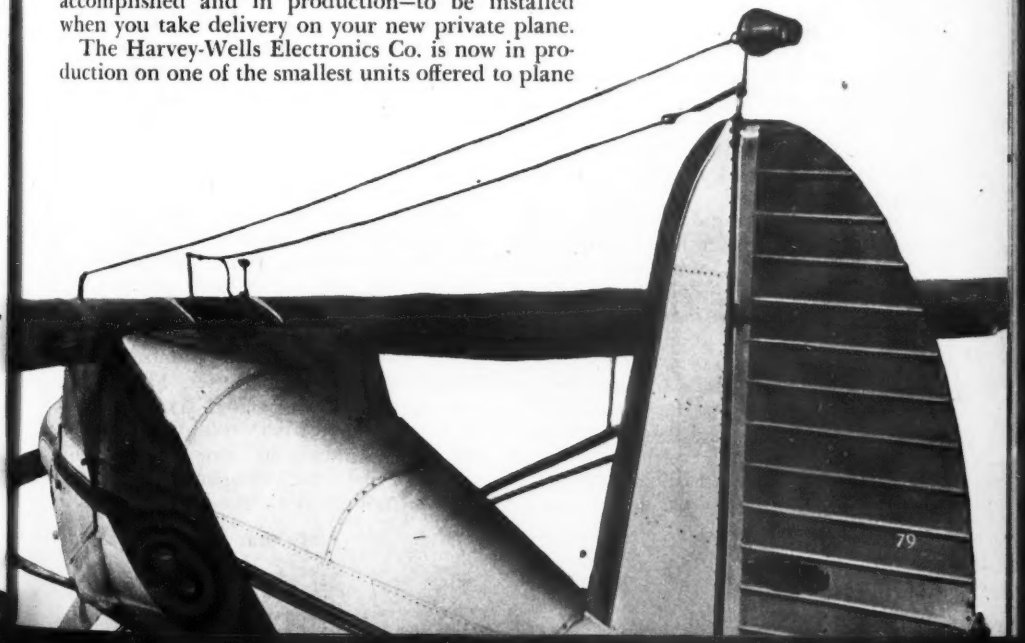
THERE are no sign posts in the sky. It's possible to drop into a convenient airport and ask directions, but, cruising along at a couple of thousand feet, New York looks just about the same as New Jersey, Pennsylvania or Tennessee. Until they color the states the same as on the maps, the private flyer's surest way of getting from one place to another is by means of two-way radio.

Surveys have shown that most people intending to purchase the new private planes realize the need for radio—to be able to follow a beam, talk to a control-tower operator at an airport or perhaps contact a plane flying nearby. The manufacturers have realized the need, too, and are offering a variety of sets that not only provide all the necessary radio contact, but do it by means of light-weight, comparatively inexpensive outfits that won't eat up all your baggage allowance or provide a bill that looks like a war debt. You can snap a switch and listen on the same set to your favorite dance band or comedy program. Radio equipment for the Air Age is a fact, accomplished and in production—to be installed when you take delivery on your new private plane.

The Harvey-Wells Electronics Co. is now in production on one of the smallest units offered to plane



Below, an antenna installation. Drag cone upon release is driven back by airflow, pulling antenna into working position.



Your Plane Can *Talk*

Ranger 209 transmitter installed in Ercoupe. Receiver is mounted in a 3-inch hole in the instrument panel.

owners, the ATR-3 transceiver. The receiver and transmitter unit have been combined into one unit. A press-to-talk button on the microphone changes the circuit to a transmitter. Released, the button restores the circuit to its receiver connections. The transceiver itself is only 8 in. deep, with a front face panel 5.5 in. wide by 4.5 in. high. This is all that mounts on the instrument panel.

Simplicity of operation is a keynote of the panel design. Three knobs and a switch, all on the face of the set, provide fingertip control. The volume knob incorporates the on-off switch, the center knob is a 4-band control for broadcast, tower, range, and voice-range bands. The latter is a filter hook-up, so the weather reports that are sent out on a wavelength close to the range or beam signals can be heard without losing the range signal. The filter merely tones the range signal down so the weather reports can be heard while you're still following the beam.

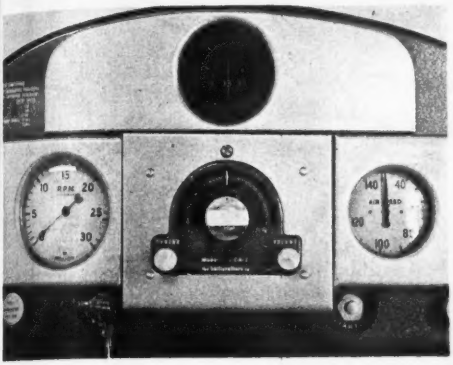
Not only are the radio sets themselves available, but Aeronautical Radio is now manufacturing fixed and trailing antenna kits. There are no special parts to make up for your particular plane. They can be purchased with all the insulators and wire, and, in the case of trailing antenna, reel, guide and fairleads are included.

For fixed antennas, the length of the wire varies, but special insulators, shock springs and fairleads can be purchased. The trailing antenna will result in better performance from any set, due to the increased length of aerial wire that can be used. The cabin roof is the most convenient place for it on ships that have doors on both sides. The wire then slides in and out through a fairlead in the cabin roof and is guided away from the tail surfaces where it might become entangled by a fairlead on top of the fin.

Where a radio installation in a private plane before the war looked like extensive laboratory test equipment, with bulky boxes and racks, Ranger's new radios are designed to fit a standard 3-inch instrument hole in the ship's panel. They are producing a dry battery-operated transmitter called the model 210 and a companion model 117 receiver that weighs 3 lb. 10 oz. complete. Antenna, headphones, mike and batteries will bring the total weight up to only 7 or 8 lb. The transmitter can be tucked away in the baggage compartment or on the shelf behind the seat. Even the lightest of personal planes can spare the weight and room of this installation.

Ranger is also making a more powerful receiver and transmitter called the 116/209 for use in a plane that carries a 12-volt storage battery and generator. These units in combination, complete with power pack in the transmitter, weigh only 15 lb. 13 oz. and eliminate the bother of replacing batteries. They provide more powerful signal transmission and more sensitive reception, with the same mounting compactness of the 117/210 dry battery-operated sets; the receiver mounts in a three-in. hole in the

Five-tube Hallicrafters Skyfone covers aircraft and broadcast bands and has push-to-talk button.



GE Flying Radiofone, a 12-tube receiver and transmitter in one unit, operates speaker or headphone.

Stooge Bergen shudders as Charlie McCarthy sasses control tower over this Bendix Lightweight.

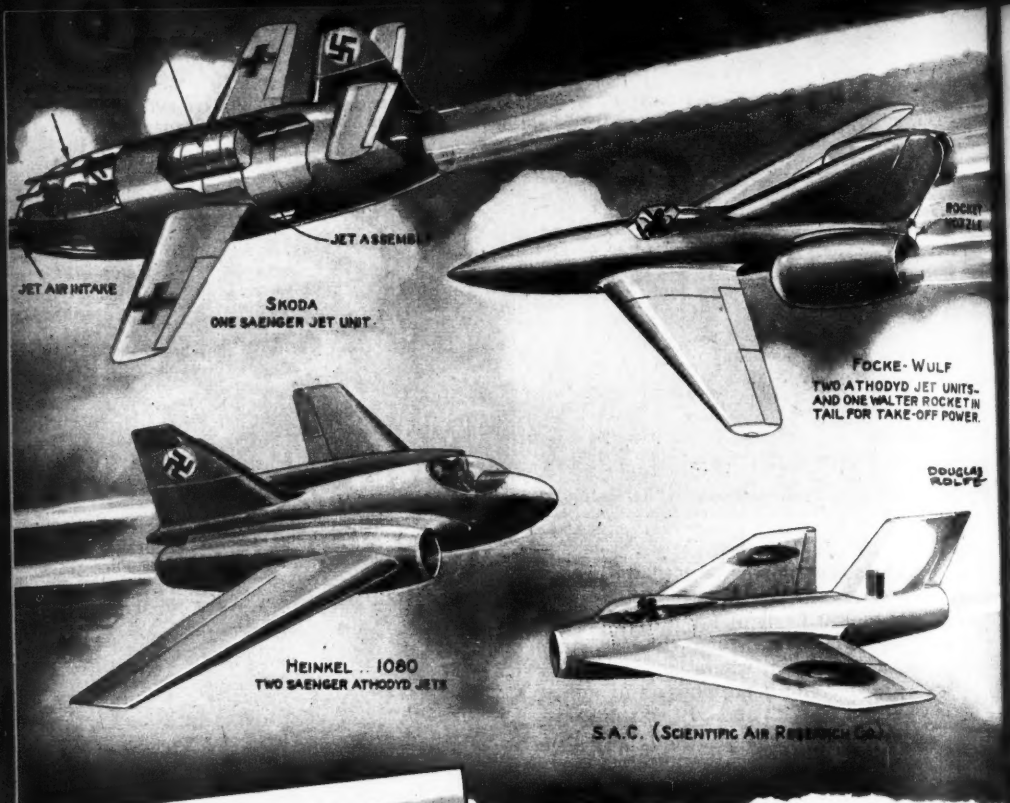
The Walcott twins, Evelyn and Elenore, hold two Lear sets, the PX'er and the portable Learavian.

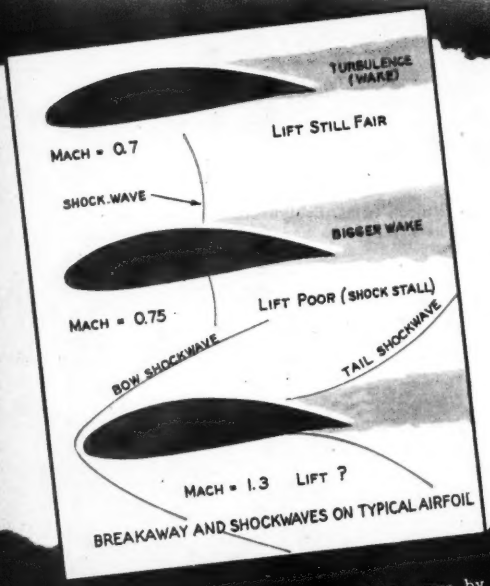
dash or instrument panel and the transmitter can be tucked away in the baggage compartment. Control for both receiver and transmitter is through the 3-in. dial face of the receiver, where jacks will also be found for the headphones and mike.

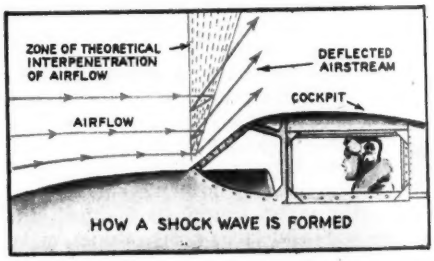
The Ranger 209 and 210 transmitters need no tuning, since a simple two-way switch is used to snap the antenna over from the fixed length for transmitting to the trailing antenna for more sensitive reception. This eliminates difficulty in tuning the transmitter; the set can be tuned by a service station and just left that way, with the pilot merely snapping a switch to transmit his voice.

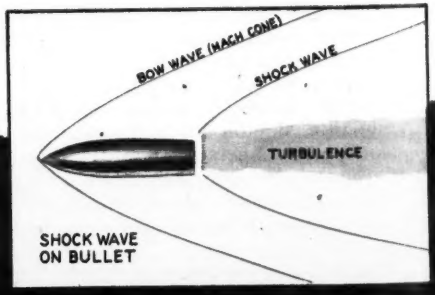
The new Bendix Flightphone PATR-10A eliminates the need to carry anything in the baggage compartment. This is a 5-channel combination transmitter and receiver in a single unit that also houses the power pack. A box 7x7x5 in. houses the entire radio equipment. Controls are all on the front face on the cabinet, making dash installation a simple matter. Servicing becomes a mechanic's dream. All he has to do is remove one cabinet and work in comfort on the bench in the shop. Run one cable for power supply, connect the antenna, and the set's ready to function. Bendix has made provision for loudspeaker operation on this set, and with the soundproofing being used on the latest private planes you will soon be able to cruise along listening to the radio just as you do in your car.

Bendix is also producing a receiver for lightplanes [*Continued on page* 88]









Above right, the formation of a shock wave by the protruding cockpit. Above, an airfoil showing the form of the shock waves at three speeds. Right, shock wave formed by a speeding bullet.

this is the *Supersonic* barrier

Extraordinary things happen close to the speed of sound.

BY WILLY LEY

Bottom view of the de Havilland "Swallow," showing its arrow-like sweepback.

FOR millenia man dreamed about flying—and did nothing about it. In 1783 the balloon was invented and people could fly wherever the wind happened to blow them. More than a century later the airplane was invented—and people began to be able to fly where they wanted to go.

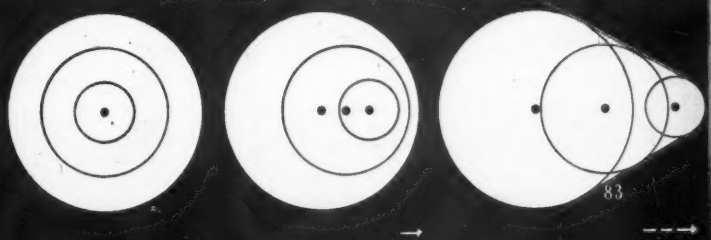
Now, forty-four years later, man wants to fly faster than sound. He will do it. Aeronautical science is close to this goal; it may take only a year or two. But there are difficulties, and most of them are tied up with something which is called a Mach number. (The term honors the Austrian physicist Dr. E. Mach, who was one of the first to investigate the problems of air resistance at high speeds.)

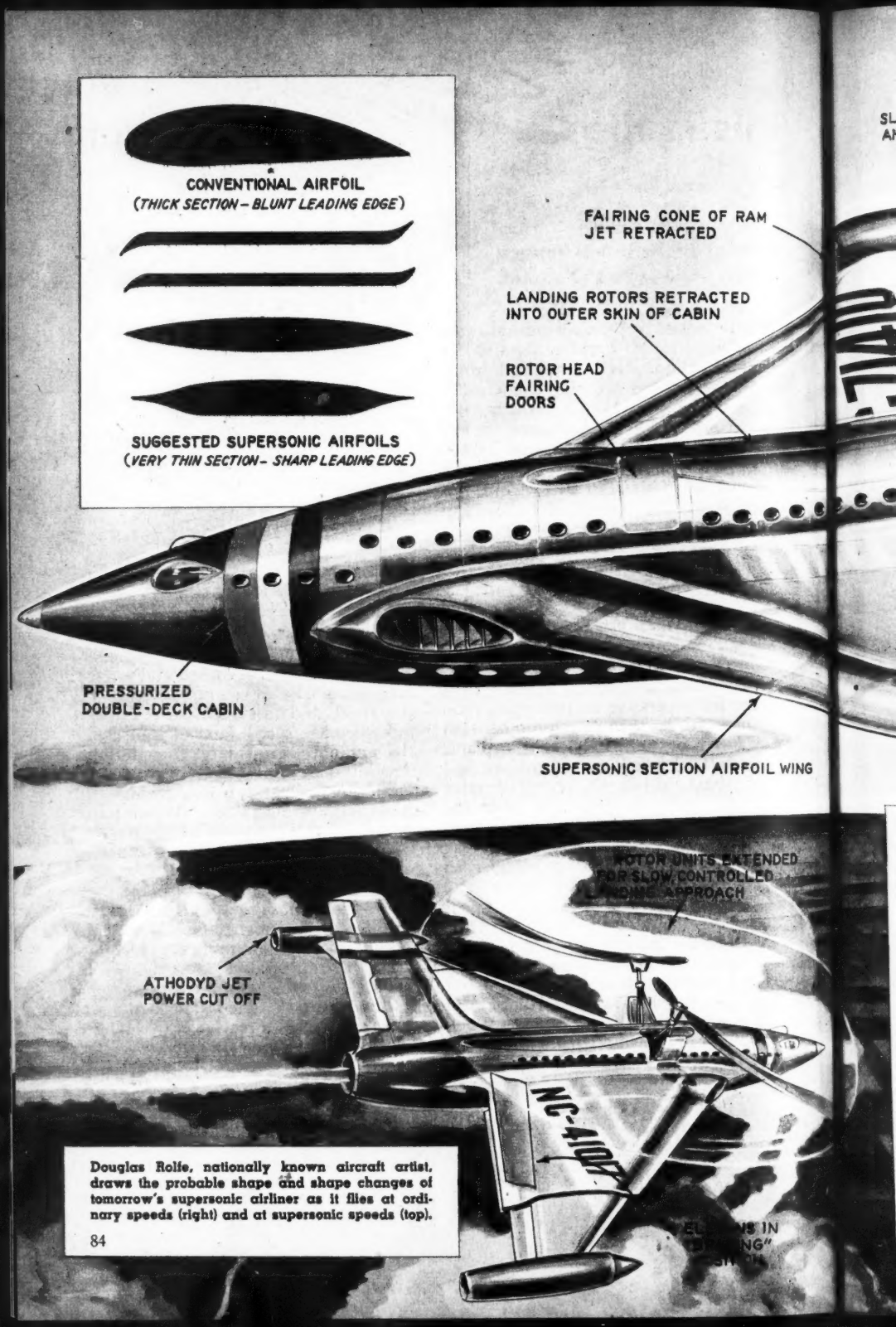
The Mach number is a convenient means for expressing an important ratio in one word: it's the relationship between the speed of something—car, airplane, rocket or bullet—and the velocity of sound at the same altitude. Note: at the same altitude. This is important, since the velocity of sound is 765 mph at sea level but 100 mph less at 40,000 feet. To say that a plane flies with Mach number 0.5 means that it has just half the velocity of sound at the altitude where it happens to be.

Because the velocity of sound decreases as we go up in the air, a plane might have Mach number 0.5 at or near sea level, but Mach number 0.7 at high altitudes. And that is where the difficulties start. When its Mach number approaches 0.7 the air begins to behave differently. Instead of smoothly flowing around the wing it tries to pile up, and at corners and surface irregularities the air gets into its own way, so to speak, and builds into a shock wave; and when the speed (and of course the Mach number) grows large enough there are additional shock waves where the airflow begins to separate from the wings. All this makes for big trouble at trans-sonic speeds.

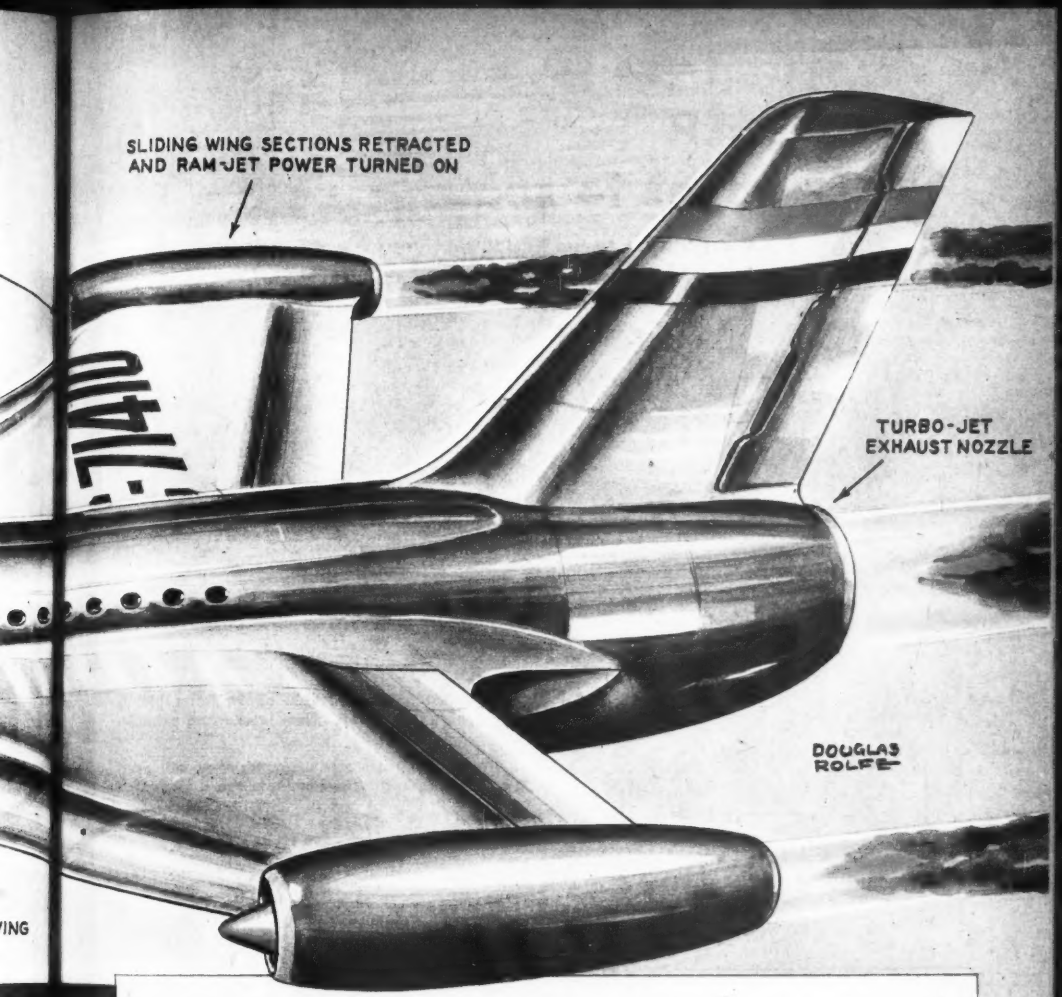
At this point we'd better define a few terms. At Mach numbers of 0.65 or less (about 500 mph or less) airplanes are said to fly at *subsonic* speeds. At Mach numbers of 1.3 or higher (say, 1,000 mph and up) they are said to fly at *supersonic* speeds. The interval between the two is called *trans-sonic,* and that is the region now under attack. The fastest planes are already in the lower reaches of that range. The Mustang [*Continued on page* 96]

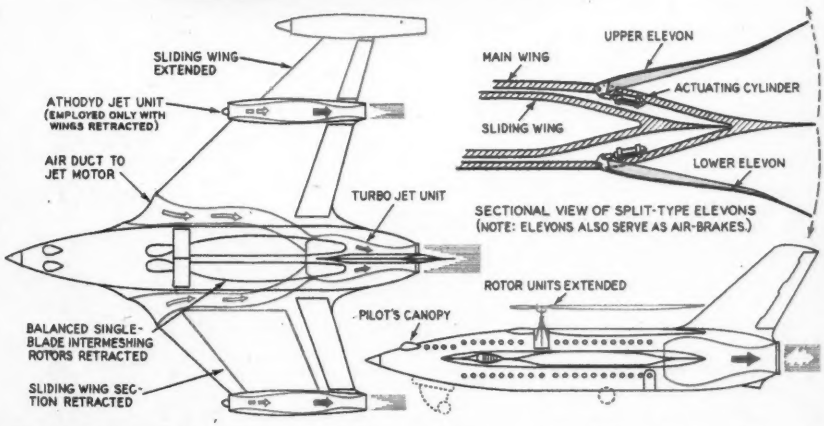
Diagrams show: left, a disturbance center that is motionless, relative to air; middle, a disturbance center moving; and right, a disturbance center moving fast.





Douglas Rolfe, nationally known aircraft artist, draws the probable shape and shape changes of tomorrow's supersonic airliner as it flies at ordinary speeds (right) and at supersonic speeds (top).



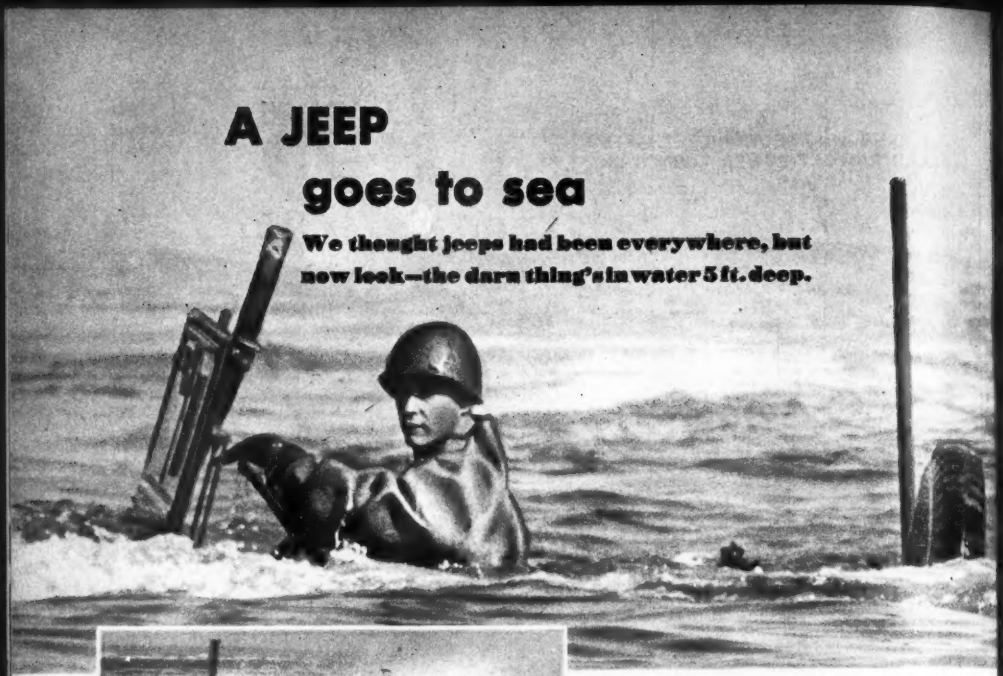


Note in diagrams and drawings that at lower speeds the wing panels are extended, and the helicopter rotors and turbo-jet unit employed.

At supersonic speeds the wing panels are retracted, the rotors fit snugly inside the fuselage, and the athodyds or ram-jets take over.

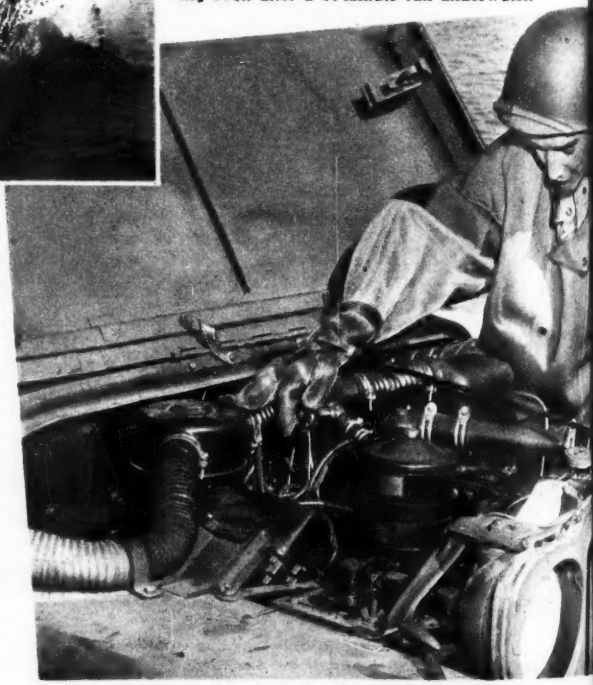
A JEEP goes to sea

We thought jeeps had been everywhere, but now look—the darn thing's in water 5 ft. deep.



It "cruises" at 6-mph, above, after hitting water at 18, left. Note intake and exhaust.

Below: Waterproofed motor was still purring even after a 15-minute run underwater.



THE jeep has not learned to talk—as yet. That comes next. In these pictures it is taking its diving lesson, and coming through without a sneeze even after a 15-minute, 6-mph trudge through water up to the driver's neck. Its swim suit (or deep water fording kit, as the Army calls it) consists of 125 parts weighing a total of 117 lbs. The engine is, of course, completely waterproofed. While it is gurgling along underwater, it breathes through extensions on the intake and exhaust manifolds. The Army uses the sea-togged jeep for fording streams.

Gyro-Glider has neither wings nor power and weighs only 120 lbs., but when airborne it is capable of lifting 300 lbs. in addition to its own weight. Towed like any standard fixed-wing glider—by a car or airplane—it can be released at various altitudes and has a descending speed of less than that of a parachute. It has two nine-foot rotating blades which can be removed for ground transportation. The tricycle landing gear facilitates smooth landings in 20 or 30 feet and is steerable when on the ground. (See "Gyro Cars for Fun," MI, Nov. '45).

Night into Day

[*Continued from page* 73]

absorbed and lost as the earth's atmosphere is penetrated. More and more studies of fluorescent lighting will help. Control which is gained over electronic beams, passed through powerful electromagnetic fields of force, will add to the picture. All studies into the accurate directing of radiant energy will build toward this further proof that the future of man lies in the upper air.

Some indication of the power required to wring this light from the heavens was given MECHANIX ILLUSTRATED by Dr. Louis M. Heil, director of the department of Physics, Cooper Union School of Engineering, New York City.

"Assuming," said Dr. Heil, "that a circle one and one-half miles in diameter (approximately the lighted area in the accompanying photograph) were to be irradiated with an even strength of ten foot-candles (about the light that falls upon a book from a good reading lamp), 490 million lumens must fall upon it. To produce this number of lumens from a neon, or from a fluorescent lamp, an input of ten million watts would be necessary. This is, of course, ten thousand kilowatts, which is, in terms of electric power production, a negligible amount.

"This figure is, of course, ideal—it assumes no loss, by absorption or dispersion, of the power going up into the air, or the light coming down to the earth. It is impossible at present to calculate these losses. The complete figure may be double, triple or even quadruple the calculated ten thousand kilowatts. Energies are easily within our reach."

Coast Guard Lays A Ghost

[*Continued from page* 58]

one mile. Thus fog no longer will interfere with this phase of operations. Loran also affords a better way to track the daily movements of bergs.

Besides the regular work of locating the ice and warning passing vessels of the danger limits, the officers of the patrol ships make a study of the ice situation, notably with regard to: currents in the area of the Grand Banks, the physical properties of the ice, its drift, erosion and melting; temperatures of sea water and atmosphere in the vicinity; habits of birds and seals with regard to ice; and any other information that might help the navigator in those regions.

The birthplace of icebergs is the interior of Greenland, covered by an ice cap 500,000 square miles in area. As this cap overflows its edges, pieces break off and drift to sea becoming what we call icebergs.

The glaciers along the central part of the west coast of Greenland are the ones that produce the bergs that get into the Labrador current and drift far to the south. The largest berg ever recorded in the northern hemisphere measured seven by three and one-half miles and was found off the Baffin Land coast many years ago.

Your Plane Can Talk

[*Continued from page* 81]

that has 2 wave-bands, one for broadcast wavelengths and the other for aircraft range and tower reception. This unit weighs but 5 pounds and mounts in the instrument panel. This set, too, provides for a loudspeaker connection in the quieter cabins. In both the Bendix sets, phone and mike jacks are separate from the sets so they can be mounted at a place in the cabin where the cords won't drape over the control wheel. Another feature of the Bendix sets is the loop antenna that is offered with a control knob for inside the cabin. This knob (and the loop) turns to different compass headings indicated on a scale below the knob. By taking bearings on two different ground transmitters, the location of the plane can be plotted on a map. This system of navigation seems to be proving the simplest for private planes.

One of the most interesting accessories to be made available recently is the new Vi-Beam, a small 1.5-lb. instrument that shows you visibly when you are on the beam or to the left or right of it. The unit plugs into your receiving set and makes headphones unnecessary. A dot in the center, and a ring, both of which will light steadily when you are on the beam, are the pilot's indication. Off the beam makes either the ring or the dot blink, depending on whether the plane is in the A or N quadrant of the beam.

Trapper a la Car

[*Continued from page* 51]

of trapping, the results have proved it to be very efficient. In a single season one trapper's catch consisted of the following animals: 2 mountain lions, 231 coyotes, 126 bobcats, 121 gray foxes, 58 raccoons, and 33 opossums, badgers, and skunks.

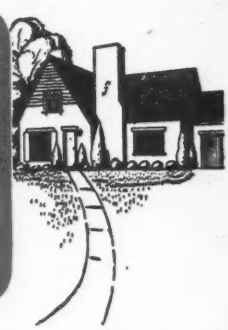
Unlike the fur trapper, who plies his trade only during the winter months when the pelts are in their prime, these men trap the year round, taking only a brief time-out during the hunting season to serve as auxiliary game wardens. Still, many of the furs procured are fashioned into smart wraps and coats for the ladies, as the choicest ones are sold at public auction, the proceeds helping to swell the state coffers.

Taking the animal's pelt is but a part of the State trapper's job however. He must also carefully label and send into headquarters the stomach of every animal caught. These are then examined to determine upon what the animal has been preying. A survey showed that in more than 8,000 cases, 20 percent of the animal's diet consisted of deer, sheep, poultry and small game.

Even with this type of trapping there are occasional thrills and chills. Meeting a snarling, spitting mountain lion face to face, when you are expecting nothing more dangerous in your trap than a cowardly coyote, is guaranteed to make even the bravest person's pulse beat a bit faster.

—*Stanley de Treville*

Have you considered a career in PLASTICS?



A job with a promising future goes a long way toward making you happy —at work and at home.

Do you know of the fine opportunities for advancement that are available in the plastics industry? Do you want to share in the development of a great new plastics era? *Trained men,* who have plastics know-how, will fill the well-paying positions in the industry. If YOU want to be one of them act NOW to prepare yourself.

Every day you can read glowing descriptions of how plastics are improving old products and creating new ones. Learn the hundreds of interesting phases of the plastics industry and be ready for the position that will give you the security and satisfaction you want.

EXCLUSIVELY PLASTICS—Plastics Institute is America's oldest and largest educational organization which devotes all of its facilities exclusively to plastics. *IMMEDIATE ENROLLMENT* can be arranged. Write for information *today!*

COMPLETE COURSES—You learn the various phases of plastics from these courses... materials, designing, molding, fabricating, laminating and testing. You acquire a basic knowledge of plastics that can be invaluable to you in acquiring the type of position you want.

YOU MAKE THINGS—We supply materials. To give you practical experience in working with plastics, we supply handsome, colorful rods, sheets and tubes of plastics from which you make useful, attractive creations. You form, dye, decorate, cast and laminate various types of plastics. You also design and develop your own ideas. You can make and sell plastics articles to earn while learning.

START YOUR FUTURE TODAY—Mail the coupon below, now! You will get an interesting, illustrated, free booklet with valuable information about plastics. Get complete details about the world renowned Plastics Institute Resident School, located in beautiful Southern California. Also learn about the comprehensive Plastics Home Training Course, which prepares you for a future in plastics while you continue your present job. Clip this coupon and mail it TODAY!

Write Dept. MI7-2, 1601 S. Western Ave., Los Angeles 6, California

Home Training Courses and Resident School APPROVED FOR VETERANS

Plastics

INDUSTRIES TECHNICAL INSTITUTE

NEW YORK CHICAGO LOS ANGELES

PLASTICS INSTITUTE in the heart of sunny Los Angeles. Here modern laboratories and shops give Resident School students facilities for practice on the finest of industry-type plastics equipment. Also the headquarters for HOME TRAINING.

FREE BOOKLET
Send For It Today!

Plastics Industries Technical Institute
Dept. MI 7-2, 1601 S. Western Ave., Los Angeles 6, Calif.

Mail in Envelope or paste on penny postcard

Gentlemen: Please send me the booklet "World of Plastics" and information on your Resident School Courses ☐ Home Training Courses. ☐ I understand there is absolutely no obligation.

Name (PRINT) ..... **Occupation** .....

Street (PRINT) ..... **Age** .....

City ..... **Zone** ..... **State** .....

Important: Please fill out coupon *completely.* If Veteran, please check. ☐ If in Armed Services now, please check. ☐

MI Tests the Jeep

[*Continued from page* 71]

do it in about two hours and fifteen minutes. Normally, as soon as I hit clear roads, I cruise at just a fraction over 60, so I wound up the little jeep as tight as it would go, and the little 63-hp engine was screaming murder when I got to my regular speed and I felt like a bug riding a flying shingle in a hurricane. After several minutes of this I tapered off to a more favorable 50.

Up to this point, all I have been doing is praising, so now for a little tearing down. The roadability of the car above 45 is not good. The body has a very top-heavy feel when you swing around curves at this speed, and this is easily understandable because the inside ceiling is about the highest of any station wagon I have seen in a long while. There is loads of room inside, and the visibility is without an equal in station wagons; and it is just because of the ceiling and roominess, plus the fact that the tread is about two to three inches narrower than the average car's, that you get that old tipsy feeling when you take the corners too fast. The high-speed flexibility is naturally not exciting when you consider that the power plant only develops 63 hp and the vehicle weighs over 2,800 pounds. It takes a long time to build up speed after 45, but this can't be considered a shortcoming when you remember all the advantages, such as economy, compactness and roominess. Anyhow, I made the run home in two hours and 45 minutes which is only a half hour slower for the 105 miles than I usually make it in one of the fastest road cars made.

My duck-shooting companion proved a much harder man on the poor car than I'd have been, however, for he immediately wanted to go on a cross-country tour, and I mean cross country! He also wanted to run through the marshes and along the beach! So we started off across the fields of high grass, bumpity-bump, and though we didn't have the jeep of the war we found it plenty tough and my admiration started to climb. Our Waterloo came when we got into soft mud and had to enlist the services of several locals to push us out. A little later, in deep sand, I was stopped again, and I must say the old four-wheel drive and snow tires of Pappy Jeep would have sure proved handy. This is definitely not a sand travelling jeep; nevertheless, it still has a lot of old jeep characteristics when you bound off the highway and head into the woods or across open fields. It's a little terrier which should be very popular with sportsmen who need a car that can carry a large load of supplies. That night, after missing my customary number of ducks, myself, wife and five others piled into it and drove over to a friend close to 25 miles away, and in spite of the added load we all had plenty of room and the little car didn't seem to notice the extra burden.

I feel I can best sum up my opinion, after its tough three-day workout, by saying that if I could afford to own an extra car, I'd go out and buy one tomorrow.

Scientists Raid Ocean Floor

[*Continued from page* 62]

The Supersonic Fathometer, a device similar to radar, which tells immediately the depth of the ocean and something of the composition of the sea bed, has already done much to further industrial research beneath the ocean. The potential rewards to industry are tremendous.

Oil companies have long been pumping oil from the ocean's sea bed in what is known as the tide-water region—the strip extending from where the tide waters touch land to the edge of the continental shelf. The sea-bottom may become a first-rate issue for International conflict, for already lawsuits have arisen over the legal ownership of the sea bed in the tide-water region and the right to extract oil from it.

Governments are very much aware of the treasures that lie in the sea and below it. President Truman has said, "Petroleum geologists believe that portions of the continental shelf beyond the three-mile limit contain valuable oil deposits. The study of sub-surface structures associated with oil deposits which have been discovered along the Gulf coast of Texas, for instance, indicates that corresponding deposits may underlie the offshore or submerged land.

"The trend of oil-productive salt domes extends directly into the Gulf of Mexico off the Texas coast. Oil is also being taken at present from wells within the three-mile limit off the coast of California. It is quite possible, geologists say, that the oil deposits extend beyond the traditional limit of national jurisdiction."

He added that minerals other than oil may be expected to be found in these submerged lands—such minerals as sulphur, zircon and rutile, in addition to petroleum. Gold also exists in these areas.

Among the other discoveries in the deep will be new forms of sea-bottom vegetation and strange and fabulous animals dwelling in the haunts of the midnight sea, animals that may dwarf the whale and stagger the imagination for size and shape. In the shoal waters of the lands of the world, new and beautiful undersea gardens will spring up, and husbandry of the sea will take its place along with farming on the land.

The possibilities for advancement are tremendous. And in the vanguard of science will be men in under-water laboratories with the inventions previously mentioned, exploring, experimenting, pushing the ever-receding frontiers of our nation down into the dark depths of the ocean world.

The next few years will see the fruition of man's long struggle for supremacy over the deep, the explorer, scientist and industrialist advancing hand in hand to open up this new world and pour its riches into our laps. Then, with the advance of the rest into the new realm of the undersea for sustenance, work and sport, the conquest of the deep will be complete.

—*Joseph G. Cowley*

Clear, Detailed Plans that leave nothing to guesswork

— the kind of helpful project material you get in

THE *Deltagram**

. . . popular woodworking hobbyists' magazine

Step-by-step directions for making exciting Deltagram projects are complete and easy to understand. They are made that way by the use of clear pictures, detailed working drawings, and common, every-day words.

Even a beginner can follow Deltagram instructions without waste of time and costly materials.

Everything Shop-Tested!

All plans, projects, designs, and shop hints are shop-tested, before being shown in The Deltagram.

Thus, you can count on their being a big help to you, in producing good-looking results that win admiration . . . in performing tool operations more easily, more quickly, more safely.

Subscribe Now!

Let The Deltagram give you enough plans and ideas for two whole years of woodworking fun. Get your subscription in now!

Paper shortages permit us to print only a limited number of Deltagrams. So to avoid disappointments, fill out the coupon below now. Then mail it today with a one-dollar bill or money order.

*Trade Mark Reg. U. S. Pat. Off.

2 Years' Subscription only $1!

Right to your mailbox — in 12 big Deltagrams — comes page after page of how-to-do-it information for making furniture, lamps, toys and games, other thrilling projects!

HM-49A

Delta Manufacturing Division
Rockwell Manufacturing Company
Milwaukee 1, Wisconsin

ROCKWELL — DELTA MILWAUKEE

Tear out coupon and mail today!

DELTA MANUFACTURING DIVISION
694B E. Vienna Ave., Milwaukee 1, Wisconsin

Enclosed is $1.00 in full payment for two whole years' subscription to The Deltagram. (12 issues)

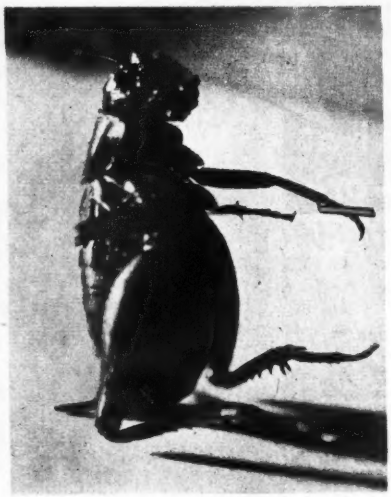
Name.....

Address.....

City.....(.....) State.....

Java in a Jiffy is easy with the new tubular aluminum coffee maker at left. Six cups can be brewed in three minutes. When the beverage has drained from the upper tube, the metal collar is removed. The sharp edge of the lower container is for dripless pouring.

Homemade Amphib below can be pedalled across water at five knots and overland at a steady 18-mph, claims the man who built it, Norman Skyes of Cheshire, England. It is made mostly of wood, has three wheels and can be mass-produced cheaply, he says.



Vain Cricket, left, holds a mirror in its "hand" as you can see if you look closely. The cricket is one-half inch high, but the mirror measures only .09 by .015 inches. It's used to study electricity.

Tiny Lung at right was developed by the Army Air Forces for use in areas stricken by infantile paralysis epidemics. Designed and built in the Aero-Medical Laboratory at Wright Field, it is used with an anesthetic type mask.

NEW!

NO. 77 X-ACTO WOODCARVING SET

Contains:

6 different chisel and gouge blades, scalpel-sharp, of high carbon surgical steel. Flat, "U" and "V" shapes.

4 assorted regular blades.

2 three-inch blades.

1 specially designed handle, to take all blades.

Complete, with hardwood block and transparent acetate cover . . . Only **$3**

THE PERFECT TOOLS

for carving wood, plastics, linoleum or what have you—with special rigidity for heavy cutting

This is it! The sweet and handy set you woodcarvers, model builders and artists have been clamoring for . . . the super-topnotch job you expect and get from X-acto.

Six scalpel-sharp, new chisel and gouge blades, each a different shape, each designed with an ingenious architectural rib in the tang end to give you the special rigidity you need for deep cuts, curves and angles. Plus a half-dozen other X-acto blades and a specially designed X-acto handle into which all blades fit interchangeably.

What versatility! You can use this new No. 77 for anything from a life-size statue to a tiny scale-model plane . . . and know you'll do a better, quicker job, *as always* with X-acto!

Have you seen

"The Big Shot?"

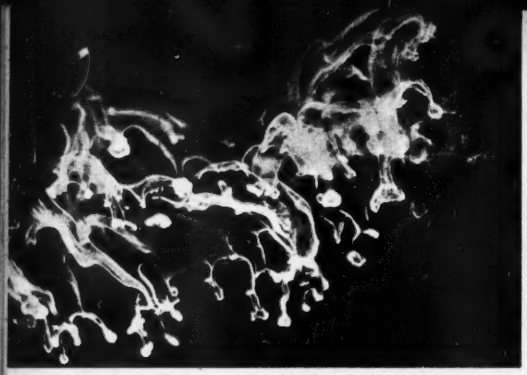
It's got everything! Knives, plenty of blades, specially designed hobbycraft tools for every exacting job. Contains: 3 X-acto Knives; complete assortment of blades; stripper; sander; planer; saw; drills and holders; ruler. Complete in desk-drawer size wooden chest $12.50

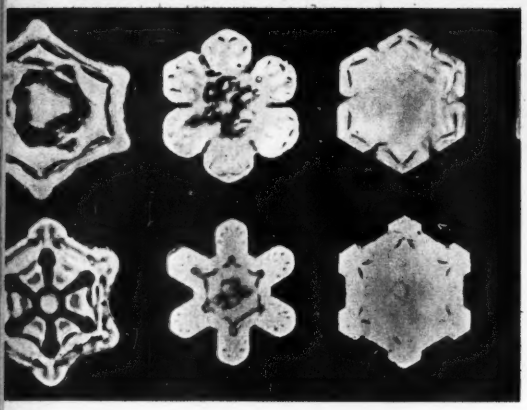
X-acto* KNIVES & TOOLS

Singly or in sets, 25c to $45.
At hobby, gift and hardware shops

X-acto Crescent Products Co., Inc., 440 Fourth Av., N. Y. 16
In Canada: Handicraft Tools, Ltd., Hermant Bldg., Toronto

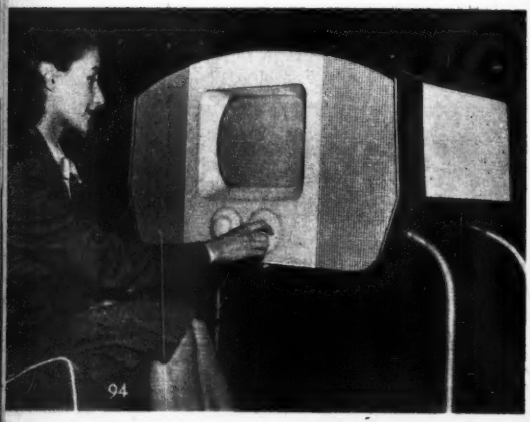
**Reg. U. S. Pat. Off.*





Man-Made Snow is shown in the process of being created by Vincent J. Schaefer in the General Electric research laboratories. He makes a cloud by breathing into the chamber, above, which has been cooled to five degrees below zero. Through this cloud he waves his scientific wand (temperature, 70 below) which leaves tiny ice germs in its wake, as in the photo at top, left. At left are plastic replicas of Schaefer's snow which prove it to be the real thing. He believes that his method can be made to work outdoors as well as in the laboratory, and his plans include experiments from an airplane in natural clouds. Good news for skiers!

Tiny "Tellies" were the centers of attraction at recent television shows on both sides of the Atlantic. The table model at right, below, was displayed at an exhibition in the Waldorf Astoria Hotel in New York City. The set is encased in Lucite to permit an interior view. The receiver below was featured at a British show in the Victoria and Albert Museum in London.



"THIS WISDOM MUST DIE!"

Truths That Have Been Denied Struggling Humanity

FOR every word that has left the lips of bishops or statesmen to enlighten man, a thousand have been withheld. For every book publicly exposed to the inquiring mind, one hundred more have been suppressed—*damned to oblivion*. Each year of progress has been wilfully delayed centuries. Wisdom has had to filter through biased, secret sessions or ecclesiastical council meetings, where high dignitaries of state and church alone proclaimed what man should know.

Are you prepared to demand the hidden facts of life? Will you continue to believe that you are not capable of weighing the worth of knowledge that concerns your personal freedom and happiness? Realize that much that can make your life more *understandable* and *livable* has been left unexplained or intentionally destroyed. At first by word of mouth only, and *now* by private discourses, are *revealed* those truths which secret brotherhoods preserved in ancient temples and hidden sanctuaries, from those who sought to selfishly deprive humanity of them.

THIS *free* BOOK OF EXPLANATION

Let the Rosicrucians, one of these ancient brotherhoods of learning, tell you about these amazing truths, and explain how you, too, like thousands of others, may now use them to enjoy the fullness of life. The Rosicrucians, (not a religious organization) invite you to use the coupon opposite and receive the FREE copy of the fascinating, Sealed Book, with its startling tale of *self help*.

The ROSICRUCIANS (AMORC)
SAN JOSE, CALIFORNIA, U. S. A.

Scribe M.H.W.
THE ROSICRUCIANS (AMORC)
Rosicrucian Park, San Jose, California, U.S.A.

Please send me your FREE Sealed Book. I am sincerely interested in learning how I may receive these long-concealed facts of life.

Name.....

Address.....

Supersonic Barrier

[*Continued from page* 83]

and a few other propeller-driven fighters had Mach number 0.6. The jet planes hit Mach 0.7 and the British "Meteor" and the German "Komet" (Me-163) got to Mach 0.8.

An airplane is dependent on airflow, especially the flow around the wings. As long as the speed is low, Mach number 0.5 or less, there is a smooth flow around wings and fuselage; or, rather, it is possible to design wings and fuselage in such a manner that the airflow is not noticeably disturbed. But when the speed goes up, shock waves begin to form, first in corners, then even along the wing, and when the process has gone far enough the airplane just can't fly any more. The formation of shock waves eats up energy which should be used for propulsion. This could be overcome with additional engine power, except for one thing: the shock waves forming on the wings directly destroy the lift of the wings, the wings lose their power to sustain the plane in the air—and the pilot finds himself confronted with "shock stall."

There are figures available for two typical wing sections or airfoils. One is the airfoil type RAF 89; the other is NACA 0012. The former has a thickness of 25 percent of its chord, the latter a thickness of 12 percent of its chord. The former begins to give compressibility trouble at Mach number 0.6; the latter delays it until Mach number 0.75. Wing thickness is therefore very important.

The arrangement of the wings seems to be almost as important as their shape. Carefully contrived experiments seem to favor a sweepback which would have been thought ridiculous only a few years ago. Strong taper also seems indicated.

As for the leading edge itself, it is well established that it must be sharp.

There is another very important factor. If the plane is fast enough there certainly will be shock waves somewhere, no matter how carefully everything has been designed. Now, a shock wave originating anywhere on the plane is bad enough as a source of energy loss even if it just travels out into the open air, but things get much worse if it can hit another part of the plane. This will not only lead to additional losses but can actually cause structural damage.

Keeping all these problems in mind, the picture of the future trans-sonic and supersonic airplane emerges about as follows: the fuselage will have a circular or near circular cross section and the cross section will be as small as possible. The nose will taper to a sharp point, like the nose of a high-velocity projectile. The wings will be attached relatively far back on the fuselage. They will have a sweepback of about 60 degrees and, in all probability, will be strongly tapered. They will be very thin in cross section, with a ratio between thickness and chord of maybe as little as 6 to 8 percent. The tail assembly will have to be placed in such a manner that it is out of the way of any shock waves that will form in front. Propulsion will be by means of a jet engine or liquid fuel rocket motor, located in the extreme tail end, if at all possible.

What makes the problem of wing design for a supersonic plane so difficult is that, while the matter of strength is critical, to say the least, there is so very little room for the internal bracing of the thin wing required. There can be no external bracing, for each external brace would add its quota of shock waves.

Another difficulty connected with the wing is the question of what it would do at low speeds. It is probable that a wing which has maximum excellence at Mach number 0.7 and higher will be inefficient at Mach number 0.5, and very poor still lower. Every airplane has to spend some time at relatively low speeds—the time taken in takeoff and landing. It may be that the takeoff troubles of a wing which is poor at low speeds will be circumvented by using a jet engine or rocket motor powerful enough to lift the plane and bring it up to speed regardless of poor wing performance—but there would still be the difficulty of landing.

Man will no doubt get his wish of flying faster than sound. We already recognize many of the difficulties between us and that goal. We no longer think them insurmountable, but there's no doubt that they are *big*.

Confessions of Hot-Rod Jockey

[*Continued from page* 55]

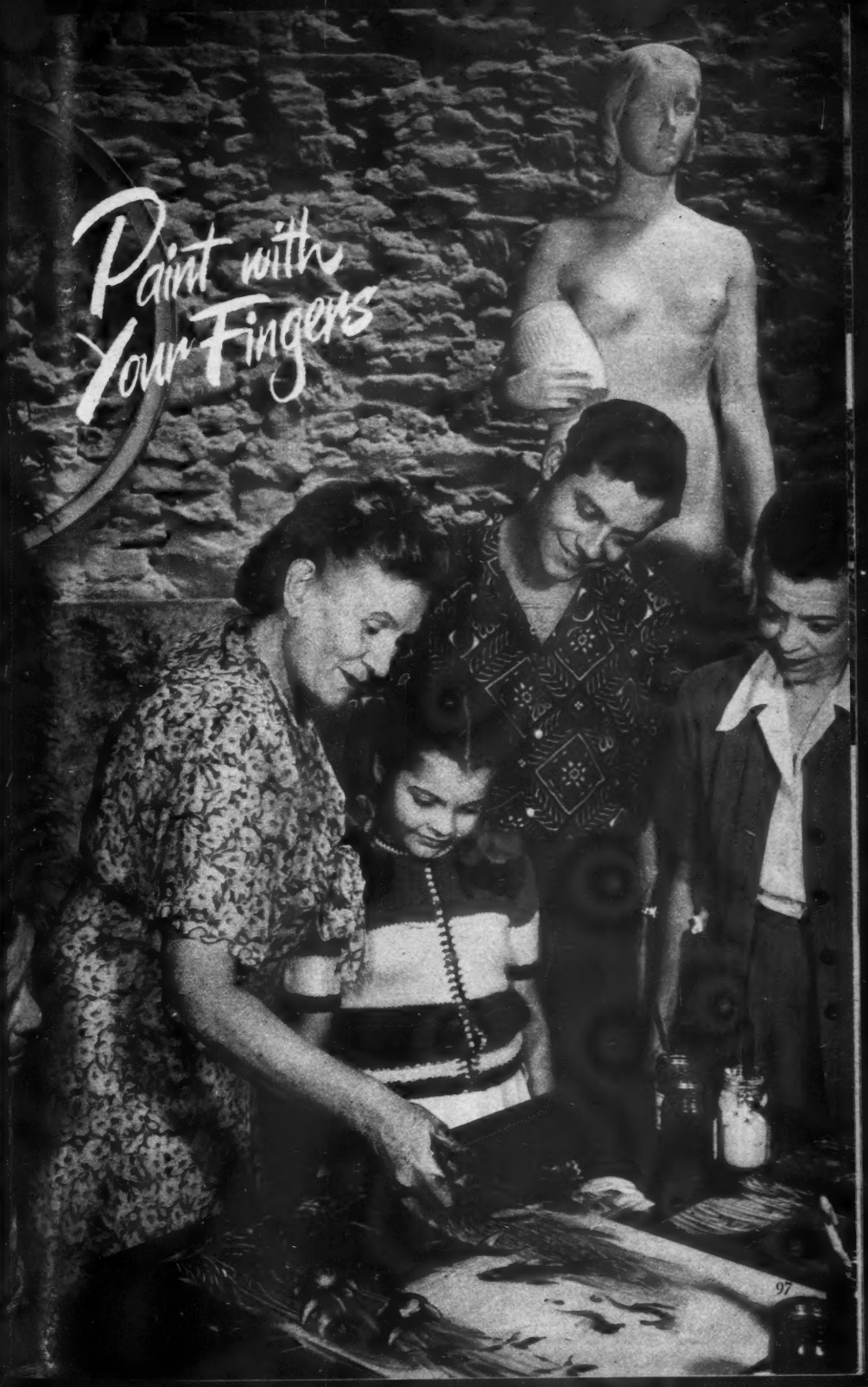
spark needed with higher rpm and increased compression, replace his conventional fuel pump with one providing forced feed to the carburetion system—and do lots more minor puttering.

Frame changes depend largely on the ingenuity of the builder and the equipment he can obtain, keeping in mind the lowering of the center of gravity as much as feasible. Higher steps, built into the front and rear of the frame by cutting and welding, can provide a drop of several inches. Channeling the body can provide probably all the drop needed, but this involves much fitting.

On fuels, most drivers prefer 100-octane gasoline for speed tests. Some use a mixture of 100-octane with white gasoline; others use a mixture of benzol, white gas and methanol alcohol, or straight alky alone. Alcohol, neat, has increased speed by five per cent.

At normal speeds, the hot rods are amazingly good on fuel economy. A fast roadster averages anywhere from 20 to 30 miles on a gallon of 82-octane gasoline while breezing along at about 50 mph. The answer lies in high compression, high gearing and accurate timing, combined with the low weight of a car stripped for speed.

It's a great sport, if you're smart, careful and a darn good automobile mechanic. A real hot rodder is all three.


Paint with Your Fingers

Paint with Your Fingers

You may not make masterpieces, but you'll paint a picture of your hidden neurosis.

BY GOLD V. SANDERS

BECAUSE a clever school teacher invented a novel way to instruct her small pupils, psychiatrists now have a valuable new implement for ferreting out emotional disturbances and laying bare the innermost personality of the mentally ill.

Odd as it may seem, this important device is finger painting, the making of pictures by smearing paint on paper with fingers and hands. It was developed by Ruth Faison Shaw as a simple art form for children, but it turned out to be something far different and more potent.

Today some of the leading psychiatrists in this country are employing it regularly as an aid in diagnosing the more puzzling types of emotional and mental disorders. The prime objective of the physician is to get at the causes of the neurosis or psychosis, so any new device for that purpose is of importance, especially now, when a majority of the patients in veterans' hospitals are suffering from mental or emotional illness.

Strange indeed are the facts that have been learned about the effects of finger painting on human beings. There seems to be an innate desire in people—children and grown-ups alike—to smear. And there is a mysterious stimulus to the creative instinct in the smearing, for without training, without skill or artistic talent, people produce pictures that are surprisingly good.

But, more than this, they transmit to the painting without conscious effort any deep-seated emotional tensions they may have. The painter himself, if he is mentally disturbed, is always in the picture, though he may not be recognizable. He is usually the central, most noticeable figure. And the persons or feelings that are upsetting his emotional life are there also.

A self-portrait of a murderer flanked by her two victims, clearly indicating how finger painting unconsciously reveals inner conflicts.

Most surprising fact of all is that mentally ill or emotionally disturbed persons have an urgent desire to explain the meaning of their paintings. Having finger-painted their problems and feelings on paper, they feel detachment from them, and willingly describe themselves by talking about the picture. Here is where the psychologist learns what he wants to know and gets a clearer picture of the patient's personality than he might obtain otherwise, or only after weeks or months of skillful probing.

Miss Shaw, a school teacher from North Carolina—shown on first page demonstrating her technique—is given full credit for bringing this valuable instrument to the attention and recognition of psychiatrists.

"Finger painting gives color and form to thoughts for which children often have no words," says Miss Shaw. "By encouraging them to explain their pictures, the teacher is able to recognize the bogeys that torment them and then help to banish them from the child's mind."

Not only children, but adults as well, take to finger painting avidly and find the same relief from their nervous tensions and anxieties. And it is good for so-called normal people. The psychologists call it a mental cathartic. Since all of us have a creative urge, finger painting, because of its simplicity, gives us an outlet. There is no necessity for skill, training or artistic ability. You just take a blob of paint and start to work. All parts of the hands, fingers, wrists and even arms may be used, and the results are frequently remarkable.

Paintings of very young children and of mentally deranged adults are alike in that they seem to make no sense; but adroit questioning and encouragement to explain bring out the fact that the incomprehensible forms do represent something in their minds. The method is fully as useful when the painter is entirely inexperienced and unschooled.

A woman who had killed her husband and her rival and was confined in a hospital for the criminal insane was observed to make three crude human figures in all of her finger painting efforts. After a while she showed a desire to tell what the pictures meant. She herself was the central character and her two victims were always on either side of her. She said the two murdered people were always bothering her in her dreams and wouldn't go away. After she painted their pictures she would wipe them off completely—her unconscious effort to get rid of them. After she had wiped them out this way many times they seemed no longer to trouble her. In her case, as in many others, the painting helped to diagnose her trouble and helped in curing her.

In the painting above a lady of the evening unconsciously symbolizes herself among fenced-in horses.

"Seven Dance on Stage While Hundreds of People Clap"—by a crippled girl who yearns to dance.

The things that mentally-disturbed people put in their paintings are not usually so simply explained as this, however. Some require the utmost skill and patience of the psychiatrist to interpret. The patient often puts in substitute figures or strange symbols for those he has in his mind. It is quite common for

The revealing finger painting of a very much disturbed prisoner of war (a sex criminal).

psychotics to substitute animals or fishes for human characters.

Alone in her New York studio late one afternoon, Miss Shaw received an unannounced visitor, a strange-acting young man who gave no sensible explanation for his presence. Finger-painting equipment lay spread on a large table, and, as he showed curiosity about it, she invited him to try his hand at it.

The boy made a few tentative smears and then began to make pictures with great eagerness and enthusiasm. He finished three of them without stopping, seeming to be completely wrapped up in this new form of self-expression. Miss Shaw recognized him to be a badly disturbed human being and started commenting, tactfully encouraging him to interpret them. Accustomed as she was to hearing people blurt out secrets after the stimulus of finger painting, she was scarcely prepared for what this boy told her.

One of the pictures was an

Painted by a victim of amnesia—who in explaining it gave his story and name.

under-water scene with some well-formed fishes and other figures that were not recognizable. She complimented him on his work, pointing out the fishes as being very good. Then, all of a sudden, he started to enlighten her, and what he told was a hair-raising story of crimes committed.

Four fishes in one group, he told the startled Miss Shaw, were four of his victims. The large fish swimming the other way was himself. He was escaping. The large number of almost formless figures were policemen searching for him. All this he related calmly as if he were talking about some other person than himself. The teacher recognized the crimes he described. They had stirred the city.

As simply as that, the young man confessed his guilt. With an effort the teacher kept outwardly calm, while mentally seeking a way to extricate herself from her precarious situation. Finally she persuaded the boy, a deserter from the Army, to report back to his unit and tell the story there.

While this was an unusually dramatic climax of a finger-painting experience, it was not out of the ordinary in Miss Shaw's experience, except for the fact that serious crimes were revealed rather than more prosaic personal problems.

The finger-paint method is being used now in several Army and Navy hospitals where it has been found of much value as an outlet for nervous tensions and as a diagnostic technique in both mild and severe mental cases. Miss Shaw is now devoting her time exclusively to the problem of salvaging the unfortunate victims of the war. She has been engaged by Dr. Karl Menninger, superintendent of Winter Hospital, Topeka, Kansas, to assist in teaching the 300 psychiatrists who are to be trained there for duty in this and other veterans' hospitals. All of these young doctors will learn the finger-painting technique from the school teacher who discovered it and brought it to the attention and recognition of the scientific world.

Photos by Leeser, Camera Clix

In starting a finger painting you put blobs of color on wet paper and swirl them in any way that pleases.

Fingers, fist, palm, forearm may be used. Above, Miss Shaw is shaping three animals at the same time.

A landscape fantasy by Miss Shaw showing the surprising possibilities of finger painting.

Daredevils On The Run

BY EDWARD KELLY

Bobsledding is "the most dangerous sport." You don't have time to think. You just react. And if you react wrong you rarely get a second chance.

"THE most dangerous snow and ice sport in the world"—that, by general opinion, is bobsledding. You must have iron nerves, or none at all, to streak down a mountain side through a narrow trough of ice at the rate of 60 miles an hour, only 10 inches off the ground. Frequently there is no time to pass signals, or even to think. Each man must know intuitively when to shift his weight by "bobbing," and the driver must time his steering by fractions of seconds. That's why even the best of sledders have had many incredibly narrow escapes from death.

Europe is the home of bobsledding and still has most of the famous runs. There it is the sport of the wealthy, and teams are closed corporations that travel about from run to run, following the competitions during the season. Famous sledders are pointed out on the street. One of the most famous is always described as the man "who has never used a brake."

Use of the brake is what chiefly distinguishes bobsledding for "fun" from professional bobsled racing. The brakeman must be as fast, as sure, and as nerveless as the driver, because, though the brake slows the sled and twentieths of a second can mean losing the race, skillful braking may help the driver out of a skid or avoid a rut.

Each man on a bobsled must literally "pull his own weight," but it is the driver's coordination and judgment that keeps the sled on the run. He must keep to the center on straightaways and choose the best drive line on curves, the latter a job that calls for lightning decisions on every run because the drive line varies with the weather.

Here in this country at Lake Placid,

Photos by J. J. Fanta

Driver Tuffy Latour and Brakeman Dick Morse crossing the finish line after a fast 90-second run at Lake Placid.

Breathlessly they speed around a sharp turn, with barely time to get set before swinging into another.

Leaning far out on a curve. Heavy men make the best riders, for weight gives more speed and aids steering.

New York State has built the only first-class engineered run in the United States. The mile-and-a-half Mount Van Hoevenberg Run is the longest and perhaps the fastest in the world. Only the St. Moritz Run in Switzerland can challenge it for speed. This winter, crowds will turn out to watch 500-pound sleds hurtle down the mountain, and hold their breath in suspense as the daring bobsledders negotiate its 25 razzle-dazzle curves, scientifically designed to penalize the least mistake of timing or judgment.

Most of the trips down Mt. Hoevenberg are for passengers, who pay one dollar apiece for the privilege of being scared out of their wits. For that is certainly the effect upon most people of flying—only 10 inches off the ground—at 60 miles an hour. The vibration is so terrific, especially if the snow is at all rough, as it is very likely to be, that you feel as if your teeth would be jarred loose. The force of the stinging wind hardly lets you breathe.

And all the while you are clinging to the side bars for dear life, convinced that if you relax your iron grip for a second you will go flying off into space—as you very likely will, on a curve. Negotiating the straightaway is bad enough, but when your sled hits a curve, and centrifugal force starts to pull at you, you feel as if you cannot stand the strain any longer. Most people, however, do, surprising themselves with the strength that they manage to summon up for the occasion; but stories are told of passengers who have suddenly thrown up their hands and started to scream. Fortunately for them, the drivers on Mt. Van Hoevenberg are so skillful that no passenger has ever been killed.

A special deity must preside over the men who "ride the ice," for stories are legion of sleds that have gone over the tops of curves, sailed one hundred feet through space and landed, with little or no injury to the men on them, in conveniently placed snowdrifts, miraculously avoiding the trunks of the trees that usually line the runs. Of course, miracles don't always happen. On one of the European runs, a photographer had placed a wire to his camera at what he thought was a safe distance from the course, but a sled went over the side of a curve and the wire sliced off the driver's head.

The two minutes or less that actually pass as you cannonball down the run are, you are convinced, the longest you have ever lived through—and quite the longest you ever want to live through. You are mashed against the man behind you so hard that your two bodies must act as one. You take your cue for the "bobbing" —the shifting of the body weight that

Aligning the runners. They must be sharp so as to hold while riding on the icy curves.

The bobsled is lifted from the storage shed to the truck by means of a traveling hoist.

At left: After starting, the brakeman hops aboard to operate the double brake handles.

Rear view showing the action of the double brake levers on the sawtooth drag bar below.

keeps the sled on an even keel and on its course—from the driver without thinking. Curves loom ahead, are negotiated on screaming runners, and are passed before you have time to have a heart attack from fright. If you had time at all to think about it, you probably would have a heart attack on the way down. But after what seems to be an eternity of expecting to fly off into space, and sudden death, your sled has reached the bottom of the run and is jolting to a stop in a shower of shaved ice, slowed up by the brake. You stagger to your feet, pale and shaking, vowing never to do it again; but in a few minutes you're probably feeling pretty cocky and considering yourself a daredevil bobsledder.

The very danger of bobsledding is the basis of its appeal. Before the war, 2,000 people a season were paying their dollar apiece to be exquisitely scared to death on the Mt. Van Hoevenberg Run, and the crowds that came to watch and suffer vicariously with the bolder ones who braved the trip increased steadily. Americans take so naturally to "the most dangerous sport" that they have defeated Europeans in two out of three Olympic competitions. And more American champions can be expected, because more runs are being planned for various parts of this country.

Basically, "bobsledding is an art that resides in the reflexes. There isn't time to think anything out. Something happens and you do the right thing, or the wrong thing, automatically." The chief difference between bobsledding and other sports is that people who do the wrong thing rarely get a second chance.

Regaining under way the bobsled is pushed by the brakeman. Note the football "crash" helmets worn by this two-man team.

Before contacts—and after.

Eyeball Glasses

Eventually nearly everyone will wear their glasses on their eyeballs.

ONE of the lesser miracles of science is the contact lens, that invisible eyeglass that fits right on the eyeball to correct imperfect vision. Now science improves on its miracle and makes the lens out of plastic, eliminating glass and its breakage and giving new lightness and improvement in appearance.

It's necessary to make a mold of the cornea and front of the eyeball. A mild anaesthetic is applied, and the molding paste doesn't hurt at all.

The lens is easily placed in the eye. Holding it by the stem of a suction cup, it is inserted first under the upper lid, then under the lower.

A small suction cup with a protruding stem covers the paste. The paste hardens, and after three minutes the mold is removed intact by the stem.

No wonder this young lady exhibits her finished lenses proudly! They are feather-light, scratch-resistant, unbreakable, and all but invisible!

A few people can't wear contacts because of hypersensitivity, but most can wear them for an hour or so at first and gradually increase the period up to eight or ten. The lens doesn't really touch the eyeball. A saline solution placed in it before it is inserted serves to lubricate the eyeball and keep the two from actual contact.

Some day spectacles will be seen only in museums.

Winners — in MI's

1ST PRIZE . . . MANHATTAN NOCTURNE
$100.00 to Ernest Palinkas, New York City, for this deliberate double exposure on Kodachrome Type B, 30 min. at stop f-5.6.

ONCE again we present on these pages the winners in MI's Color Photo Contest. The possible winners were narrowed down to about fifty entries out of the several hundred entries received, before the winners were actually chosen. The final selection was made by means of a vote conducted by the staff of MI. There were many good entries but of course only the six best were chosen as prize winners, even though many others showed considerable merit.

Now, with the conclusion of last year's contest, is a good time to start planning your entries for this year's Color Photo Contest. Watch for the announcement.

2ND PRIZE . . . . . BOBBY
This appealing youngster won $75.00 for Bob Buchanan of Jersey City. An open flash shot at f-22 with a Speed Graphic.

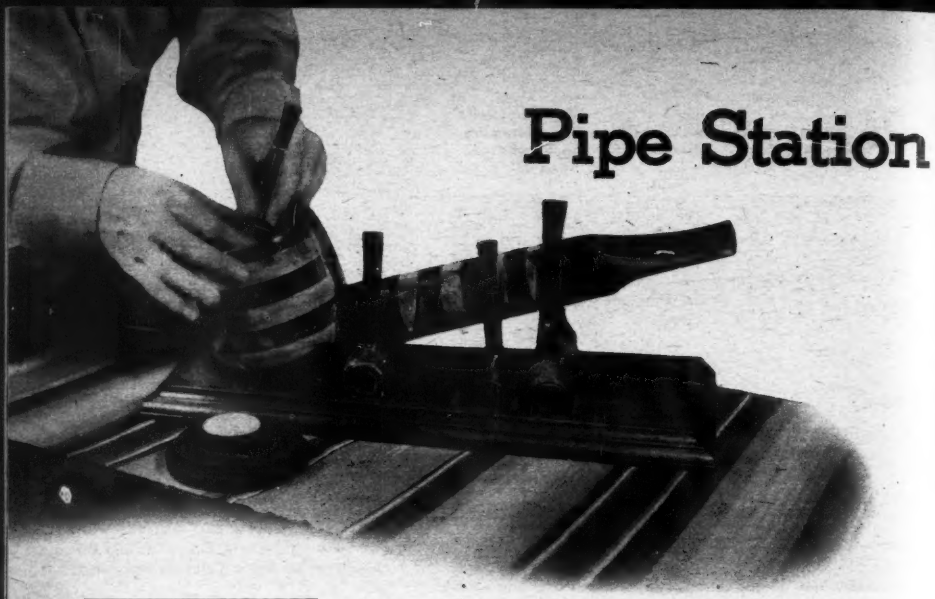
5TH PRIZE . . . . . THE SENTINEL
William Bartlett of Ava, Ill., won $25.00 for this interesting 35mm Kodachrome study of a soldier silhouetted against the sun.

6TH PRIZE . . . JUST A BOY AND HIS DOG
June De Bella of San Jose, Cal., wins $25.00 for her charming Ansco Color transparency.

Annual Color Photo Contest

3RD PRIZE . . . . . SAND SAILOR
$50 00 goes to Bill Ficklin for this Ansco Color shot which he took at Daytona Beach, Florida.

4TH PRIZE . . . . . ON TARGET
A 35mm Kodachrome by N. Dabrowski, Norwich, Connecticut, takes the 4th prize and $25.00.



Pipe Station

BY H. G. ENGELHARDT

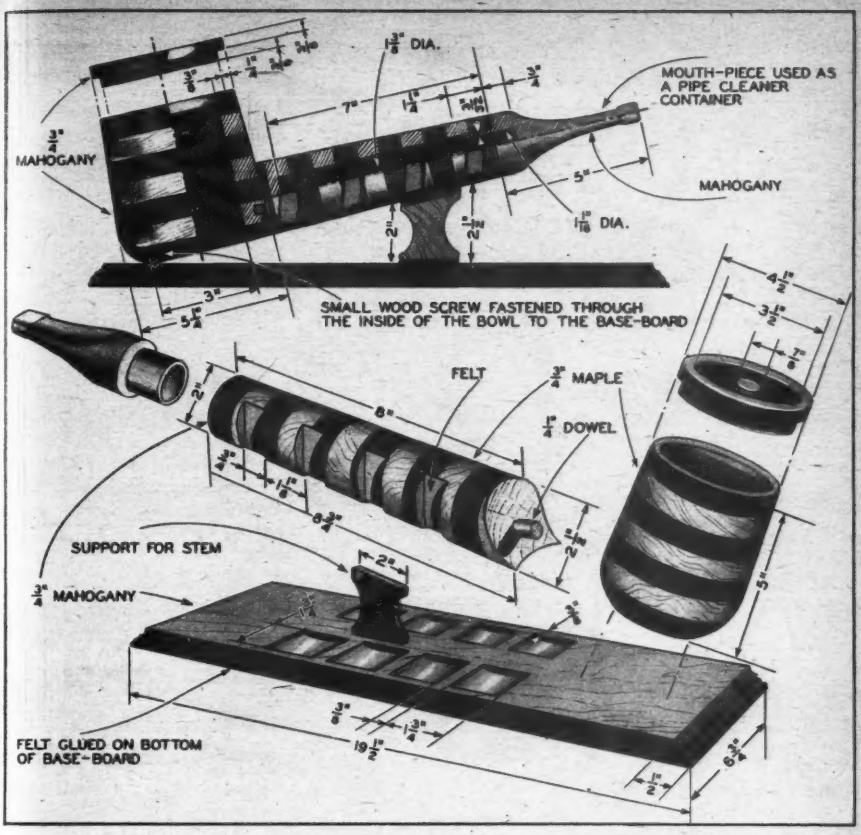
The author's favorite inspired the design for this gargantuan pipe which serves as a combination humidor and rack.

IT WAS while smoking my favorite pipe that the idea of making a large replica to serve as a combined pipe holder, humidor and pipe-cleaner container occurred. The result is the unique combination shown. The use of contrasting woods, mahogany and maple, adds to the attractiveness of this project.

The first step is to saw seven pieces (5½ in square), three maple and four mahogany for the bowl, and thirteen pieces (½ in. square), six maple and seven mahogany for the stem, all ¾ in. stock. The mouth-piece is made from two pieces of mahogany glued to make a block 3½x2¾x6½ in. The humidor cover is made from a piece of mahogany, 4¾ in. square and the base from a piece 20x7 in., both ¾ in. stock. The pieces for the stem and the bowl are glued in alternate layers as shown on the next page.

First the bowl piece is turned on the lathe. It is cut to the approximate shape as indicated in the drawing. Then while still on the faceplate, the inner section is carefully hollowed out and the cover lip cut. The stem is turned from the thirteen pieces of glued-up stock, tapering from 2⅜ in. to 2⅛ in. diameter. The mouth-piece is turned on the lathe, scroll-sawed to resemble a pipe mouth-piece and sanded. The tip is hollowed to resemble

The mouth-piece of the pipe is used to store pipe-cleaners while the bowl forms a humidor. The Pipe Station is about four times normal size.



a real opening. The space to be occupied by the pipe cleaners is drilled out of both the stem and the mouth-piece with an expansion bit.

The bowl top is turned with a knob in the center and a lip to fit into the bowl. The spaces to hold the pipes are cut into the stem with a scroll saw, with the saw table tilted for the proper angle; these spaces are 3/4 in. wide and 1/2 in. deep. The base-board is given a fancy molding effect on a jointer and sanded. The four spaces on either side are carved out as indicated and sanded. They are 1/4 in. deep.

Now for the assembly. The larger end of the stem is cut and sanded to fit the contour of the bowl and drilled for a 1/4 in. dowel. The bowl is also drilled for the dowel. The stem and bowl are then glued together. The bottom of the bowl is now sanded so that it will rest evenly at the proper angle on the base-board. A small support is cut out of 1/4 in. mahogany on the scroll saw as shown in the drawing. Now stem and bowl are glued to the base-board with the support in place so that the cuts in the stem coincide with the pipe bowl rests carved in the base-board. A screw secures the bowl to the base-board.

The entire assembly is now thoroughly sanded. The mouth-piece, bowl top and base-board can be stained with mahogany oil stain for additional contrast. The original Pipe Station was finished with garnet paper, linseed oil and then waxed.

To complete, glue felt on the bottom of the base-board and in the pipe spaces in the stem. A small humidifier secured to the inside of the humidor cover completes the outfit.

The rack is now finished. Sit back and enjoy your pipe and note the comments of your pipe-loving friends about your novel Pipe Station.

Miniature Treasure Chest

A tiny replica of Captain Kidd's treasure chest to house the family heirlooms

BY BERTRAM BROWNOLD

MI Color Photos

THE miniature brass bound pirates' treasure chest shown above is a novel and handy receptacle for milady's jewelry or the family treasures. The current vogue for so called "costume" jewelry makes a box of this kind a particularly timely and welcome gift.

The exploded view on the next page shows all dimensions. Any evenly grained quarter inch stock is suitable. Mahogany was used for the box illustrated.

Inasmuch as all the edges are concealed by the metal trim, the parts can be put together by dovetailing or with butt joints. The original chest was nailed together with the cover hinged on the inside.

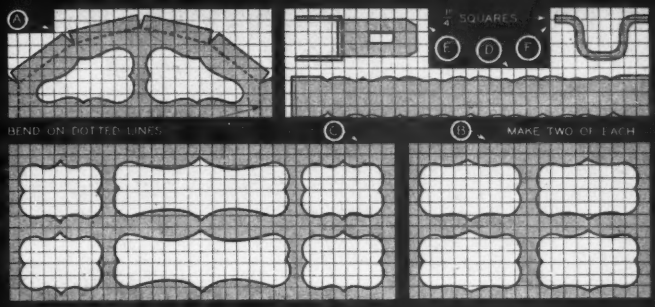
A tray made of cigarbox wood or similar light stock is optional. When completed it rests on strips nailed to the inner surfaces of the ends of the box.

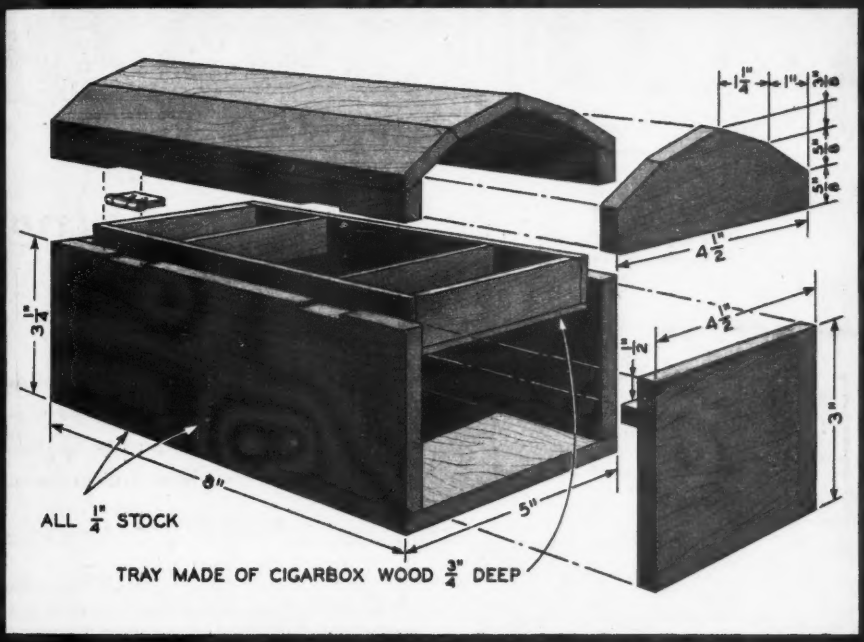
The box is trimmed with brass to simulate an old fashioned brass bound chest. Use sheet brass thin enough to be cut with an ordinary pair of scissors. The drawing on the next page shows the pattern for this trim. Scribe the designs accurately on the metal and cut two of B and two of C, all out of one strip. Then nail the strip around the box as illustrated, using brass escutcheon pins.

The hasp is cut out of a piece of sheet brass considerably heavier than that used

Guide for cutting the brass trim:

A Cover ends
B Box ends
C Front and back of box
D Band on cover
E Hasp
F Handles



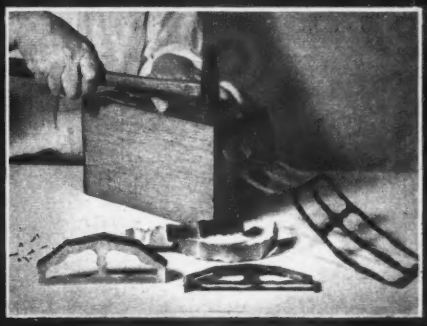


for the trim. Bend it around a piece of wire, hammer it down, and then bend the wire to form a U with square corners. Secure the hasps to the cover of the box by thrusting the wire into holes drilled to receive them and clinch on the inner side. The apertures in the hasps fit over staples driven into the box. Small padlocks known as dog collar locks are a suitable size for these hasps.

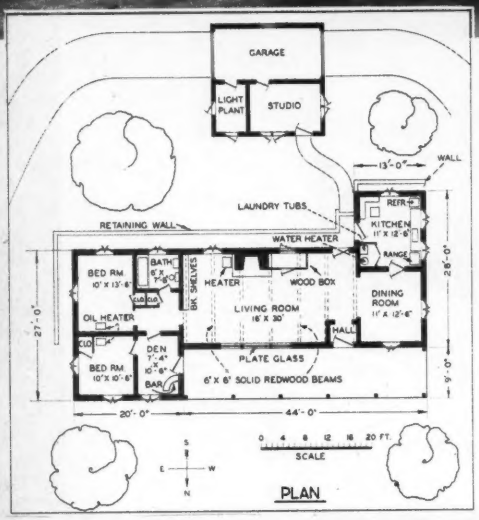
Make two handles out of wire and attach them to the ends of the box locating them as indicated in the color photos.

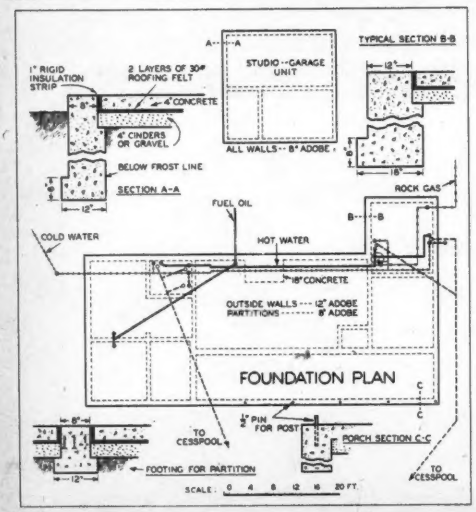
Burnish the metal parts and trim with steel wool and apply a coat of lacquer to retard tarnishing.

Nailing brass trim in place. Be sure it is drawn tight before applying hammer.



The author's adobe brick home. Tres Vacas Ranch, in Nuevo, California.





modern home from mud

Lick the material shortage by building with adobe bricks; made of stabilized soil, it is as durable as concrete and much more interesting.

BY HI SIBLEY

THERE are few sections in the United States where the soil does not contain clay suitable for making "adobe bricks." In view of the fact that the bulk of this material costs you nothing, and that you can make the brick yourself, it is the ideal medium for home construction. When mixed with an *asphalt emulsion stabilizer* the brick is as waterproof as concrete. It is an excellent insulator against heat, cold and sound. It is fireproof, termite-proof, and freeze-proof. What more can you ask—atom bomb-proof?

Adobe for the old California missions was mixed with water and straw in the original excavation. The modern way is to use a mechanical mixer so as to impart a uniform quality to the brick. Formulas will be given later. In the meantime, consider the foundation. Since 12 in. wide (one story high) adobe walls weigh

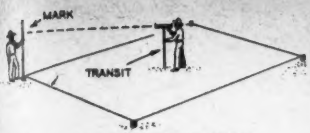


FIG. 1 METHOD OF BRINGING CORNER POSTS TO SAME LEVEL

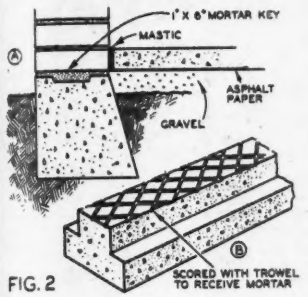
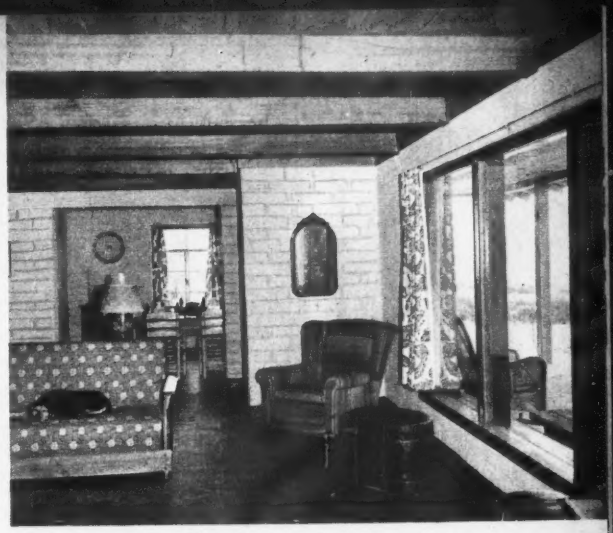
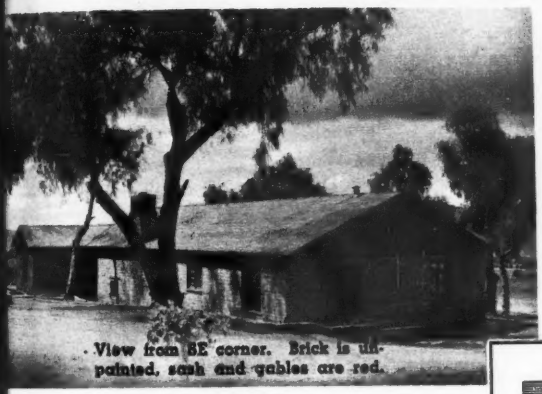


FIG. 2



View of living room showing the dining alcove in the rear.



View from SE corner. Brick is unpainted, sash and gables are red.

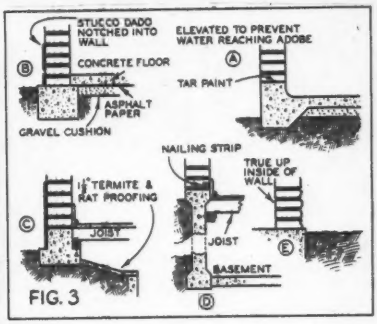
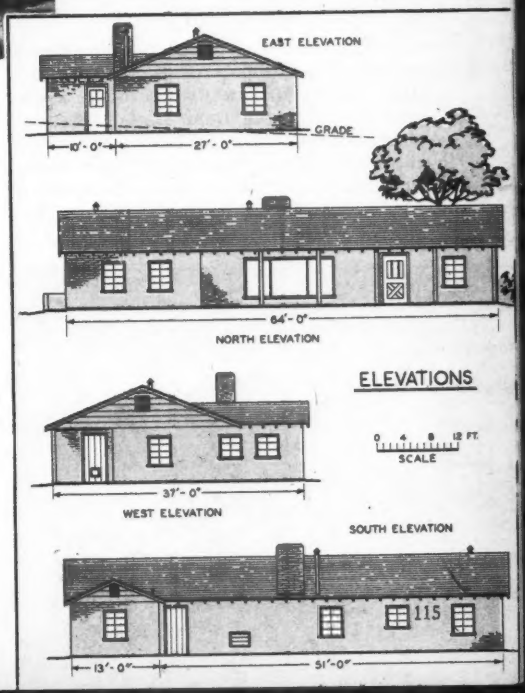


FIG. 3

about 700 lbs. to the running foot, excluding the roof, a heavier footing will be required than for a frame house.

The Foundation. The first step is to grade the site and get the corner stakes level with a transit. Trenches for the footing are dug and flooded with water overnight. The simplest footing design is shown at A, Fig. 2. This has a shallow key for mortar upon which the first course of brick is laid. In the inverted T design, B, the top is scored with a trowel to retain the mortar. This is the method used in the author's home.

In preparing the ground remove all organic matter and roots. The slab is poured over cinders or crushed stone, spread over the entire surface to an 8 in. depth and well tamped. This fill serves the double purpose of insulation and water-proofing. Over it place a layer of



Walls in ivory Chemtone yield a light interior. Note the painted "baseboard."

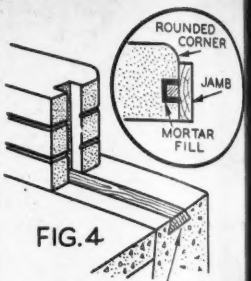
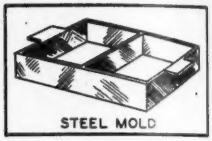


FIG. 4



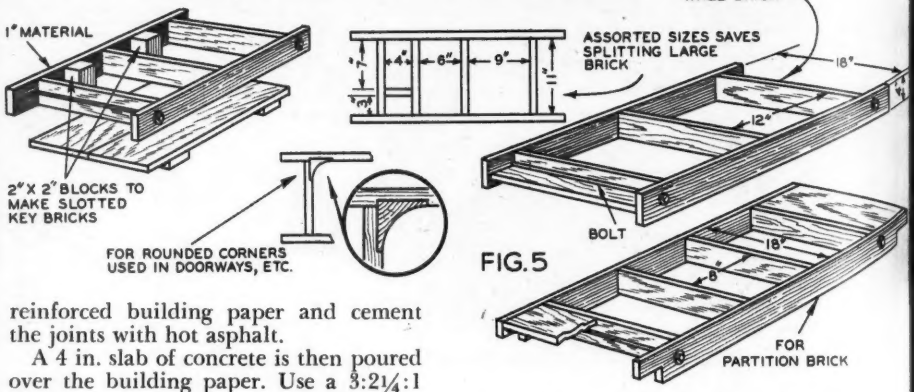


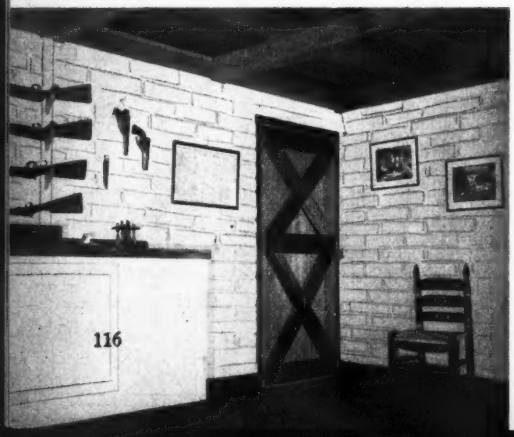
FIG. 5

reinforced building paper and cement the joints with hot asphalt.

A 4 in. slab of concrete is then poured over the building paper. Use a 3:2¼:1 mix. Maximum size of the coarse aggregate should be one inch. Do not use more than six gallons of water per sack of cement *including* the moisture contained in the sand and gravel. Cure the concrete by sprinkling at intervals with a fine spray of water.

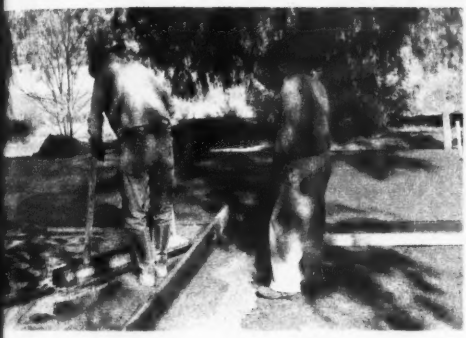
At A, Fig. 3, is shown a type of footing suitable for a garage. The brick begins well above the floor level and thus above reach of water when hosing down the floor. To protect the outside wall, the first four courses are plastered with stucco, with the top notched into the wall, B. Foundations for wood floors over basements are shown at C and D. In all cases the bricks are trued up on the inside as in E if the interior is not to be plastered. Otherwise, true up the outside.

At outside doorways lay a beveled 2x4 in the concrete to which the saddle or threshold can be screwed, Fig. 4. This illustration also shows the notched brick to receive the door jamb batten, which will be described later.



The back door of the living room is made of 2x2 in. redwood reinforced with two cross-pieces.

Living room, fireplace hood and pilasters are made of copper. Woodbox is supplied from outside.



Tamping the concrete floor before troweling.

Making the Brick. Molds for making the adobe brick are shown in Fig. 5. A 4 in. thickness is commonly used because it cures better than a thicker one. The standard size is 12x18 in. having a volume of ½ cu. ft. and a face area of ½ sq. ft., although in the house shown in the photos, bricks of 16 in. length were used. For the key bricks, adjoining door and window openings, wooden blocks are nailed inside the molds, as shown, and for rounded corners, curved pieces are installed. A mold, making several smaller bricks for fillers, will come in handy and save splitting the standard size brick.

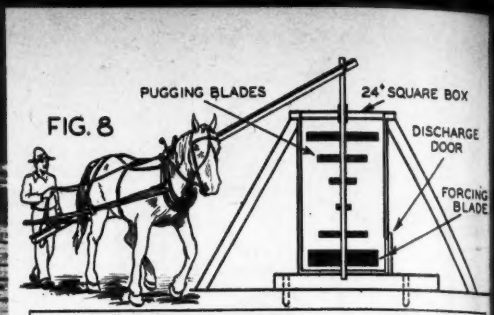
Soil must contain sufficient clay to bind strongly when dried after mixing with water. Heavy soils are usually too rich in clay and require blending with sand to overcome excessive cracking during drying. To obtain the general suitability of any soil, mold a 2 in. mud ball from a sample taken below the grass roots. If the ball dries hard and is not easily crushed, it may prove suitable for stabilized bricks. The strength is due to the natural bond of the clay and not to the stabilizer. If the soil is difficult to mix with water and the ball cracks on drying, additional sand or straw is required. Soils which contain alkalis should not be used.

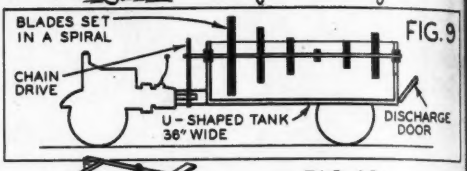
The important ingredient of adobe brick is a liquid stabilizer which not only renders them waterproof but increases their hardness until thy are practically as durable as concrete. Stabilizer is sold under the trade name of *Bitudobe* manufactured by the American Bitumuls Company, San Francisco, Cal., and *Bitumuls* sold by the Standard Oil Co. of California.

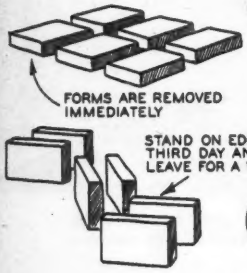
Two series of tests should be made to

View through north window across 10 miles of fertile land. Lintel over window is 1x1x16 ft.

Placing bricks on edge for additional drying and curing.







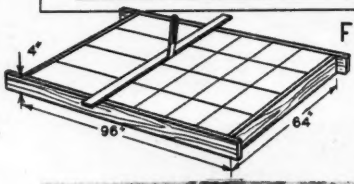
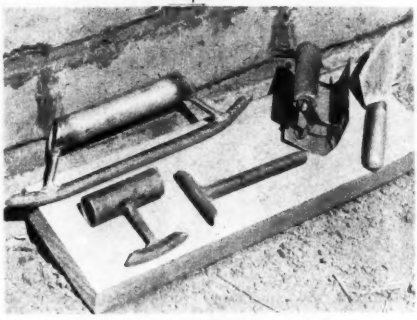


FIG 10
BRICKS CAN BE MADE IN ONE LARGE FLAT AND CUT WITH A BUTCHER KNIFE ALONG STRAIGHT EDGE

determine the suitability of the soil and the amount of stabilizer required. The first series uses water and soil, for the second series add the stabilizer. If the soil is heavy clay or adobe, mix straight soil for the first brick; for No. 2 use three parts soil and one of sand; for No. 3, two and one-half parts soil, one and one-half parts sand; No. 4, two parts soil and two parts sand; No. 5, one and one-half parts soil, two and one-half parts sand; No. 6, one part soil, three parts of sand. *Mold a full size brick in each case.* Too much clay produces [*Continued on page* 162]



Some of the masons' tools used in laying the brick.

MATERIAL LIST

WALLS

3200 adobe brick 4x12x16 in. outside walls
750 adobe brick 4x8x16 in. partitions
8 cu. yds. adobe, 150 gals. stabilizer for mortar

FOUNDATION

30 cu. yds. concrete
140 sq. yds. double strength tar paper
lumber for forms

WINDOWS AND DOORS

354 lineal ft. 2x8 in. redwood, frames
58 lineal ft. 2x14 in. redwood, sills
820 lineal ft. stops
190 sq. ft. 2 in. redwood for doors
15 pcs. pine 3x12x48 in. headers, windows, outside doors
7 pcs. pine 3x8x48 in. headers, inside doors
1 pc. pine 9x12x14 ft. headers, view window
1 pc. pine 6x8x8 ft. headers, living-dining doorway
9 steel sash, 37½x51½ in., 8 lights
3 steel sash, 37½x37½ in., 6 lights

BOND BEAM

3 cu. yds. concrete
form lumber
1 roll barbed wire

PLATE

178 lineal ft. 2x12 in. pine outside walls
84 lineal ft. 2x 8 in. pine partitions
54 anchor bolts ½x7 in.

CEILINGS

5 solid redwood beams 6x6 in. x18 ft.
2 solid redwood beams 3x6 in. x18 ft. for ends
26 pine joists 2x6 in. x12 ft.
12 pine joists 2x6 in. x14 ft.
6 pine joists 2x6 in. x18 ft.
512 bd. ft. random width 1 in. redwood, living room
754 bd. ft. 1x12 in. knotty pine, for other ceilings.

BATHROOM PLASTERING

3 bags hardwall plaster
1 bag stucco
½ ton sand

ROOF

70 pcs. 2x4 in. x18 ft. rafters
18 pcs. 2x4 in. x 9 ft. rafters
30 pcs. 2x4 in. x12 ft. tie beams
1800 bd. ft. 1x8 in. pine sheathing
100 bdls. No. 1 cedar shingles
40 pounds No. 4 galv. shingle nails
10 pounds No. 3 galv. shingle nails
2 roof vents, plumbing, bath and kitchen
1 roof jack, 3 in. for water heater
2 roof jacks, 6 in. for space heater
216 ft. 2x4 in. for rafter bracing plus flashing tin for valleys and chimney

GABLES

70 lineal ft. 2x4 in.
200 bd. ft. 1x12 in. pine siding
2 louvres, 24x30 in.
1 louvre, 18x24 in.

CUPBOARDS and BOOKSHELVES

360 board ft. knotty pine

FIREPLACE

125 fire brick
40 red brick, raised hearth
1 damper, 36 in.
4 sections oval flue tile, 13x17 in.
1 angle bar, ¼x6x44 in.

INTERIOR CORNICE and BASEBOARD

276 lineal ft. 1x6 in. redwood
276 lineal ft. 1x5 in. oak

PLUMBING

1 Kohler bathtub complete
1 Kohler close-coupled toilet
1 Kohler vit. china lavatory
1 20 gal. water heater
1 Kohler double sink
1 single laundry tray
Plus fittings, pipe lines, sill cocks, etc.

LINOLEUM

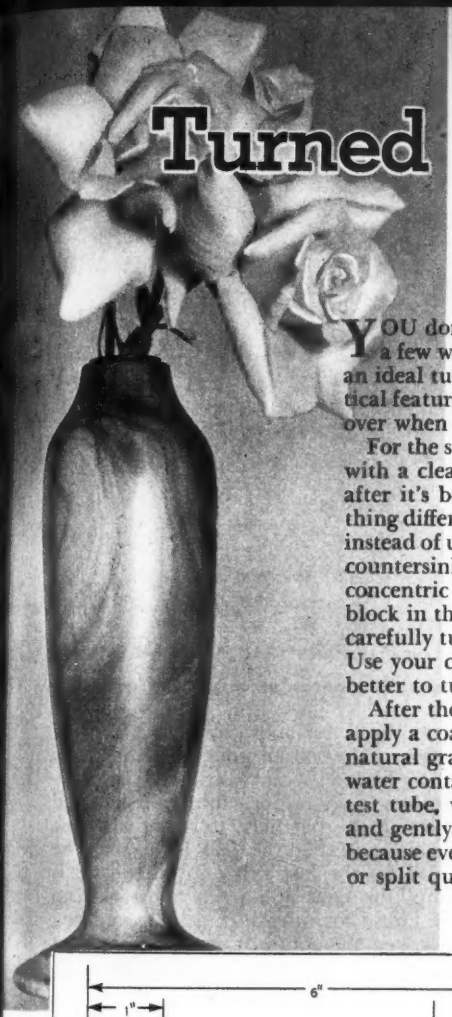
24 yds. No. 1 grade, for bath and kitchen

PAINT

15 gals. Chemtone, ivory
2 gals. stain for gables
2 gals. linseed oil

MISCELLANEOUS

20 sq. ft. tile bathroom
1296 sq. ft. ceiling insulation
Hardware, nails, etc.



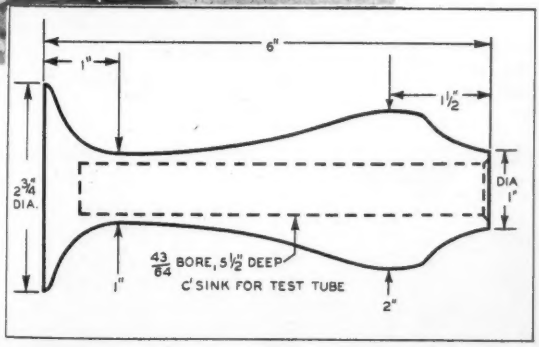
Turned BUD VASE

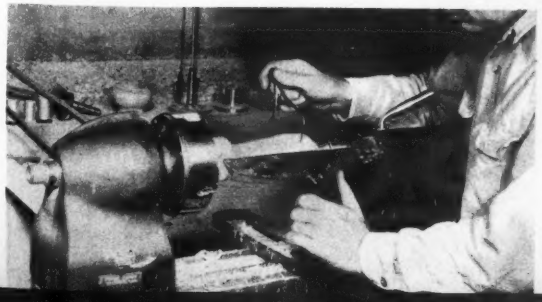
The beauty of natural wood in a classic design is a perfect setting for flowers.

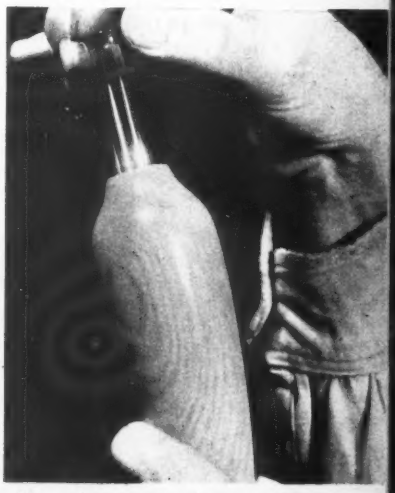
YOU don't have to give your wife a dozen roses—even a few will do the trick in this graceful vase that makes an ideal turning project. The wide footed base is a practical feature that helps keep the vase from being knocked over when it's on chairside tables.

For the stock, select a piece of well-seasoned hardwood, with a clear grain that will show to the best advantage after it's been turned and polished. If you want something different, glue up several pieces of contrasting wood instead of using a solid block. With either piece, drill and countersink the 43/64 in. hole first to be sure the bore is concentric with the outside diameters. Then mount the block in the lathe with a live center in the tail stock and carefully turn it down to the dimensions in the drawing. Use your calipers frequently and remember that it's far better to turn off too little than too much.

After the vase has been carefully sanded and polished, apply a coat of varnish or clear lacquer to bring out the natural grain of the wood. The last step is to insert the water container, which is a regular 16 by 125 millimeter test tube, wrapping a rubber band around the outside and gently forcing it in the bore. Don't try to glue it in because even the best seasoned wood will sometimes warp or split quite badly after turning.—*Edward R. Lucas.*







Above: Inserting the glass test tube.
Left: Checking the outside diameter.

boats and boating

BY WILLIAM F. CROSBY

Truscott 24-ft. Sport Cruiser

Having trouble with drips on board? Use this treatment to get rid of them.

MOST boat owners will agree there's no sport like being on the water but having some of it in the cabin is another story—and a sad one. Especially if it happens in the small hours of the morning when awakened in your berth by the drip of cold, wet rain water on your face. Or when you're dead beat at the end of a hard day and turn into a soft berth only to find the blankets a sodden mass from a slow leak in the deck.

The majority of these troubles occur in boats having trunk cabins and the fault is usually due to poor construction. The focal point for most leaks is the joint between the cabin sides and the deck, which is usually canvas covered. In many cruisers the house or cabin is first bolted down to the partners (fore-and-aft deck beams) and then the deck is put on. The canvas is the last thing installed and is simply brought up *outside* and tacked to the house coaming with a little molding to cover the joint. It is this joint that

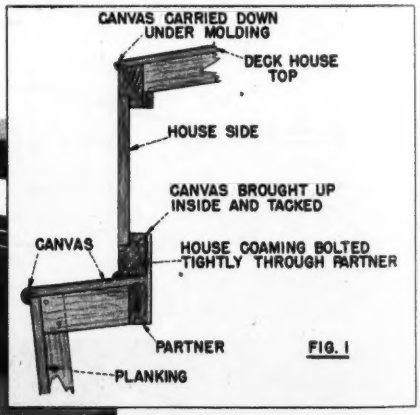


FIG. 1

Left: Aft cockpit of a cruiser showing joint between coaming and deck. Here is where leaks develop.

starts to open up after the boat is launched and when the sun gets to work. Soon you have a lot of annoying leaks that no amount of caulking will stop. In fact, the more caulking forced into the joint the more it opens up.

The answer to this problem is the construction detailed in Fig. 1. Here the main deck is completed first, followed by the canvas decking. Around the edge of the opening for the house, the canvas is left several inches longer than necessary. After the house has been bolted in place, the surplus canvas is turned up *inside* the house and tacked fast. In doing this, round off the edges of the partners to avoid a sharp bend of the canvas and possible cracking. To complete the construction, the house sides are set in rabbets at top and bottom, filled with marine glue or composition before the bolts are drawn down. On the house top, another likely source of leaks, the canvas is carried across and down under the molding as illustrated in the drawing. Using this type of construction you can get an almost 100% watertight job.

Another crew of trouble makers are the joints around deck hatch coamings. Unless you use the right kind of construction at these points, you'll have all sorts of leaks to contend with and the more caulking you use to stop them, the worse the situation becomes. The best way to lick it is to start off with a fresh slate by using the construction shown in Fig. 2—the cutaway view of a typical deck hatch. Here again the deck is completely finished even to laying the canvas. The rabbeted hatch coaming is then fastened in place and the surplus canvas again brought up under it and tacked inside, similar to the deck house construction. However, because of the square corners on most hatches you'll have to fit extra pieces of canvas to overlap the decking where it is slashed to fit around the coaming.

The hatch itself is deeply rabbeted to match the rabbet in the coaming. It should be a good fit but not too tight or it will swell and warp. By making the rabbet sufficiently deep as indicated, the water can't possibly work down inside. To avoid leaks in the cover, make it out of matched tongue and groove mahogany, well glued and strongly clamped while it's drying. Where the top pieces join the hatch frame, use a paint-soaked canvas gasket to make the cover completely watertight.

You can use similar construction around other deck openings, such as those at windshields, box-type ventilators, etc. In these places the turned up canvas will work equally well in preventing leaks. Remember though, that canvas will in time dry out to some extent and if it is bent in an extreme right angle, it may eventually crack wide open. To avoid this, round off all wooden edges at these spots. It is also a good idea to use some kind of marine composition under the house and hatch coamings when you fasten them down. If you haven't any composition, you can use a heavy coat of white lead to avoid leaks in the members.

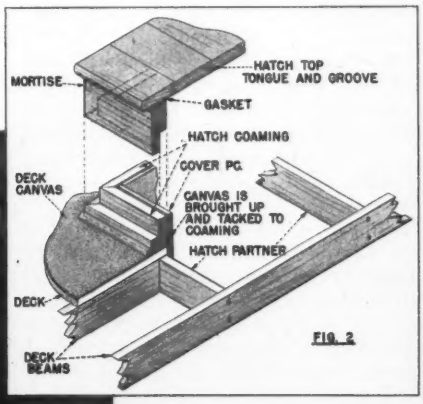
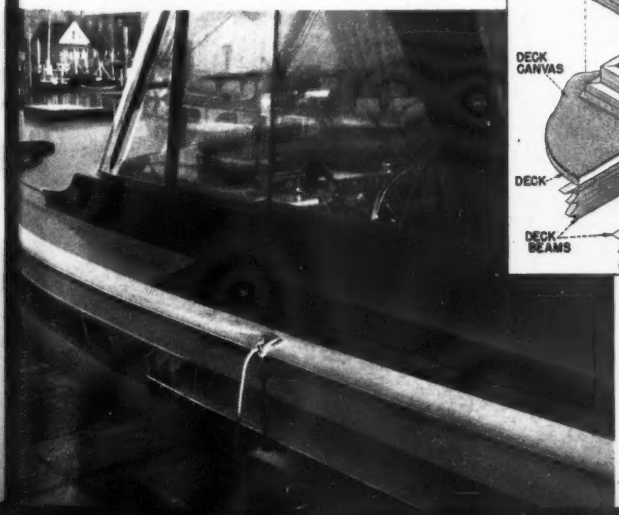
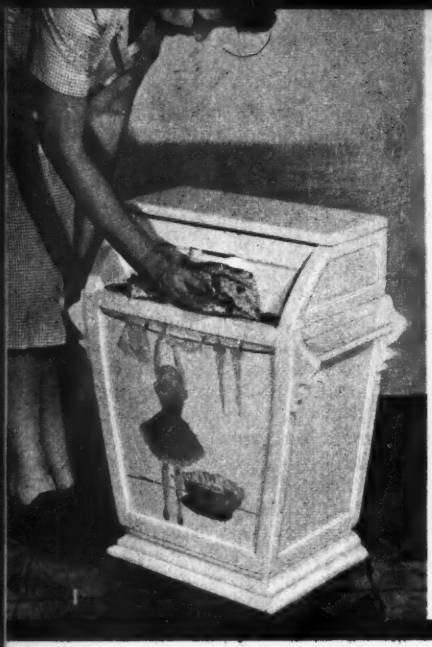


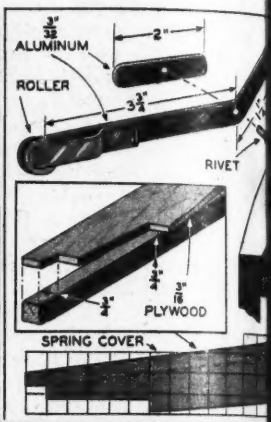
FIG. 2



Left: Watch the seam where the cabin sides meet the deck, that's where trouble is apt to start.

Handy Hamper





Drawing, right, shows construction of lid mechanism.

BY ARTHUR H. SMITH

NOT much has ever been done to improve the lowly clothes hamper. Essentially it is a glorified box with a hinged top. The lid must be raised to chuck in the secondhand shirts and socks. This is an awkward procedure, especially if Jackie insists on leaving his bath tub cruiser docked atop said lid. Or some other member of the family, not I, finds it a convenient spot to park miscellaneous articles which must be removed before the hamper becomes functional.

Something should be done to make this routine act convenient. Well, here's a one-hand, non-irritating, push-front hamper into which you can put yesterday's shirt without having a single black thought about Junior's hamper-top collection.

Photo 1 shows the finished hamper in use. Clothes are deposited through the push-front which opens with a slight pressure and closes automatically. When laundry day arrives the top is lifted as shown at 2. The push-front folds back against the hinged top; the top and push-front rest in a vertical position allowing easy removal of the contents. The towel rods on the sides also serve as handles when moving the hamper.

Fig. 2 is an exploded drawing showing construction and assembly. Details of the cover are shown above.

In forming the four upright members make a paper pattern so that all of the pieces will be alike. The curve is not critical, but the curve shown gives a graceful contour to the hamper.

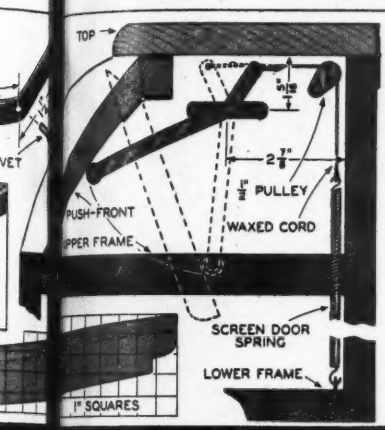
Fasten the upper and lower frame members with open mortise and tenon joints. Joints should be glued and nailed; set all nails and putty the holes. The upper and lower side members are attached to the front and back frames with a butt joint, glued and nailed. Insert the paneling later so it will not be damaged.

The two top side panels are cut from 3/4 in. pine with 1/4 x 3/4 in. strips attached to the outside faces. These strips not only add to the appearance, but finish the panels to the same width as the upright members of the cabinet frame.

Next, cut, glue, and nail the top back to the top side panels. This completes the top section of the hamper and it may now be attached to the top of the main frame.

The top, cut from 3/4 in. stock, is braced as shown to prevent warping. Glue the braces so they will clear the inside of the top section of the hamper. Before hinging the top to the hamper,

A push-type hamper made without any power tools.



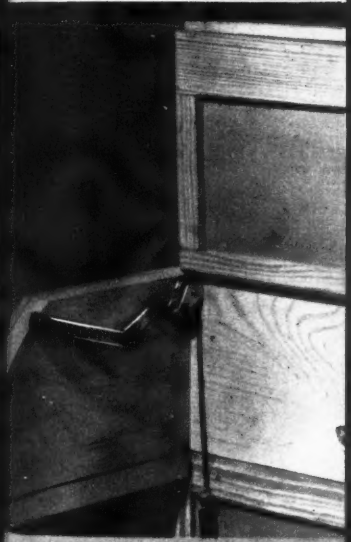
construct the push-front; it is made of a frame with a 3/16 in. inserted panel. Hinge the push-front to the front brace of the top as illustrated. Now the top may be hinged to the back of the top section of the hamper.

The next unit to be built is the base. This is composed of three frames of diminishing dimensions. The cove contour can be made with a curved chisel. The three frames are assembled with their back edges in a vertical plane and nailed and glued together to form the base.

The base is screwed to the main frame with 1½ in. No. 6 screws. Note that the base and main frame members form a rabbet into which the bottom panel of the cabinet fits.

Now the two side panels and the front and back panels may be cut. Check the inside dimensions of the cabinet frame before cutting the panels to assure an accurate fit.

The towel rods [*Continued on page* 164]



Closing mechanism is screwed to inside of top section of hamper.

A series of ¾ in. holes drilled in back panel for ventilation.

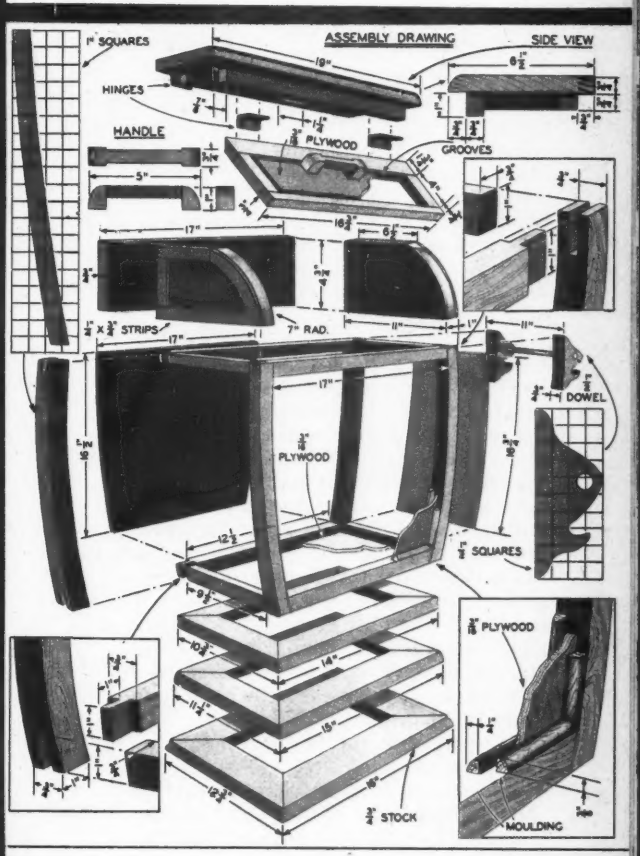


Fig. 2

"Mister MULLIGAN"

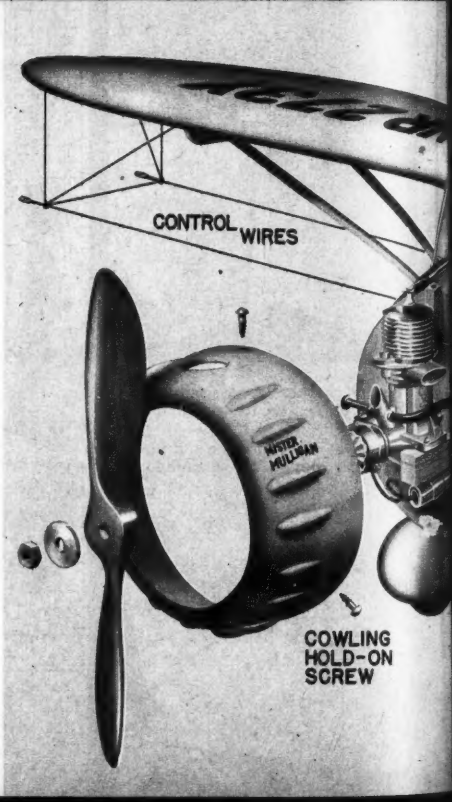
A 39-inch control-line scale replica of the famous 1935 Thompson & Bendix air race winner.

BY STINSON SMITH

BACK in 1935 one of the most unusual planes ever to enter the Thompson trophy event of the Cleveland Air Races won that classic with an average speed of 220.2 mph! Three days earlier this same ship won the Bendix cross-country race. Oddly enough, the ship, Benny Howard's "Mr. Mulligan," was unusual in the very fact that it was so conventional in appearance—for a racer. Who would ever imagine a sporty looking cabin job like the "Mr. Mulligan" winning a race against a field of hot-looking racers?

Benny Howard knew that looks didn't mean as much as design and proved it the hard way. Howard, with his "Mr. Mulligan," introduced something new in racing planes. Instead of building the usual flying engine type, he built a ship that was large enough and stable enough to be reasonably safe to fly. Equally important was a little item which Mr. Howard fondly called "go-grease." No, it doesn't come in cans. Application of "go-grease" to an aircraft merely means the reduction of parasitic drag. "Mr. Mulligan" was "greased" by having its finish rubbed mirror smooth and by applying a fillet of model airplane cement around every little surface projection.

At first glance, the Mulligan might appear too stubby for a control-line model. However, close inspection will reveal that the stubbiness is merely an illusion. Actually, the ship has a long tail moment



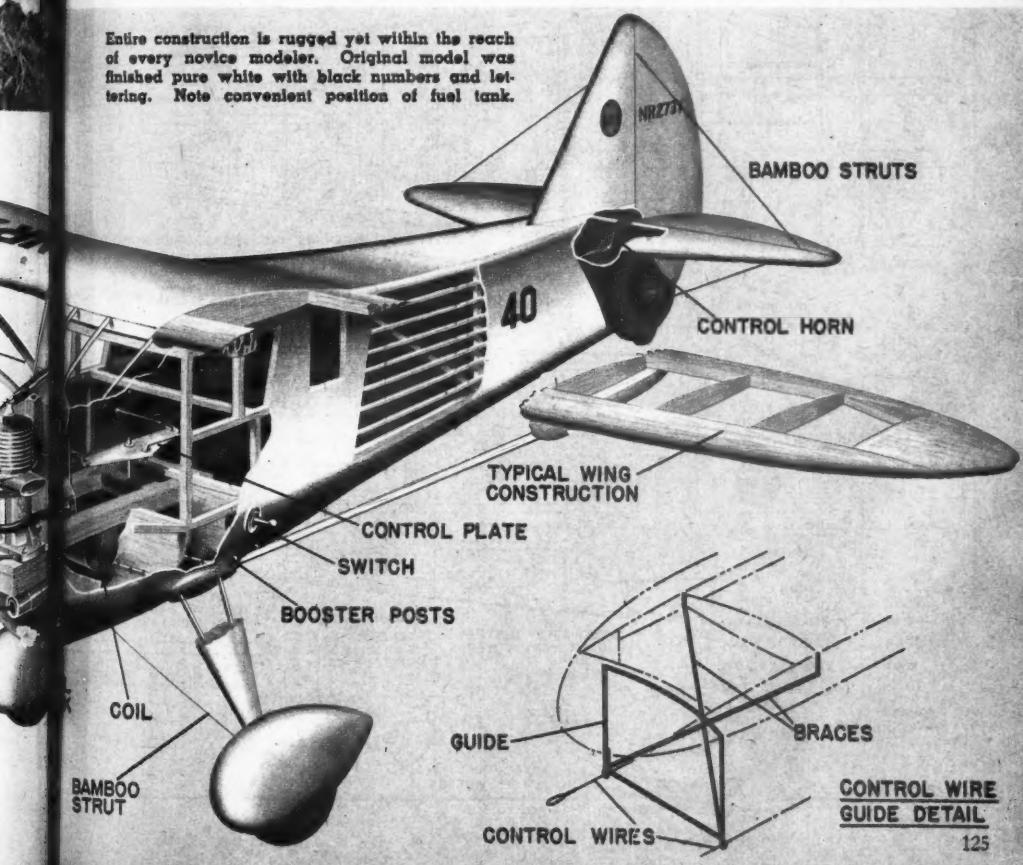
arm and generous wing and tail area; all excellent properties for a control-line model. The original model proved to be fast and stable with a good glide. While the Vivell 35 provided plenty of oomph for ordinary sport flying, a "60" is necessary for real stunting. Full size plans are necessary so either enlarge the drawings appearing on these pages or else visit your local hobby dealer for full size drawings.

The fuselage is of box type construction and is much stronger than those using the keel-bulkhead method. Start construction by pinning the hard $\frac{3}{16}$ in. square longerons directly over the plan and then filling in the uprights. After one side is complete, lay and build up the second side directly over the first. Allow the cement to dry thoroughly before removing the structure from the plans. Build up the two rectangular nose sections against which bulkheads No. 1 and 2 are mounted and form the framework as shown in the perspective views.

Spacious cowl makes installation of any engine possible. Cowl is held in place with three bolts.

Before proceeding further, install the motor mounts and then cement the bulkheads in place. The plan measurements are for a Herkimer 29 engine although any engine from a top displacement class A to one of .65 displacement can be used.

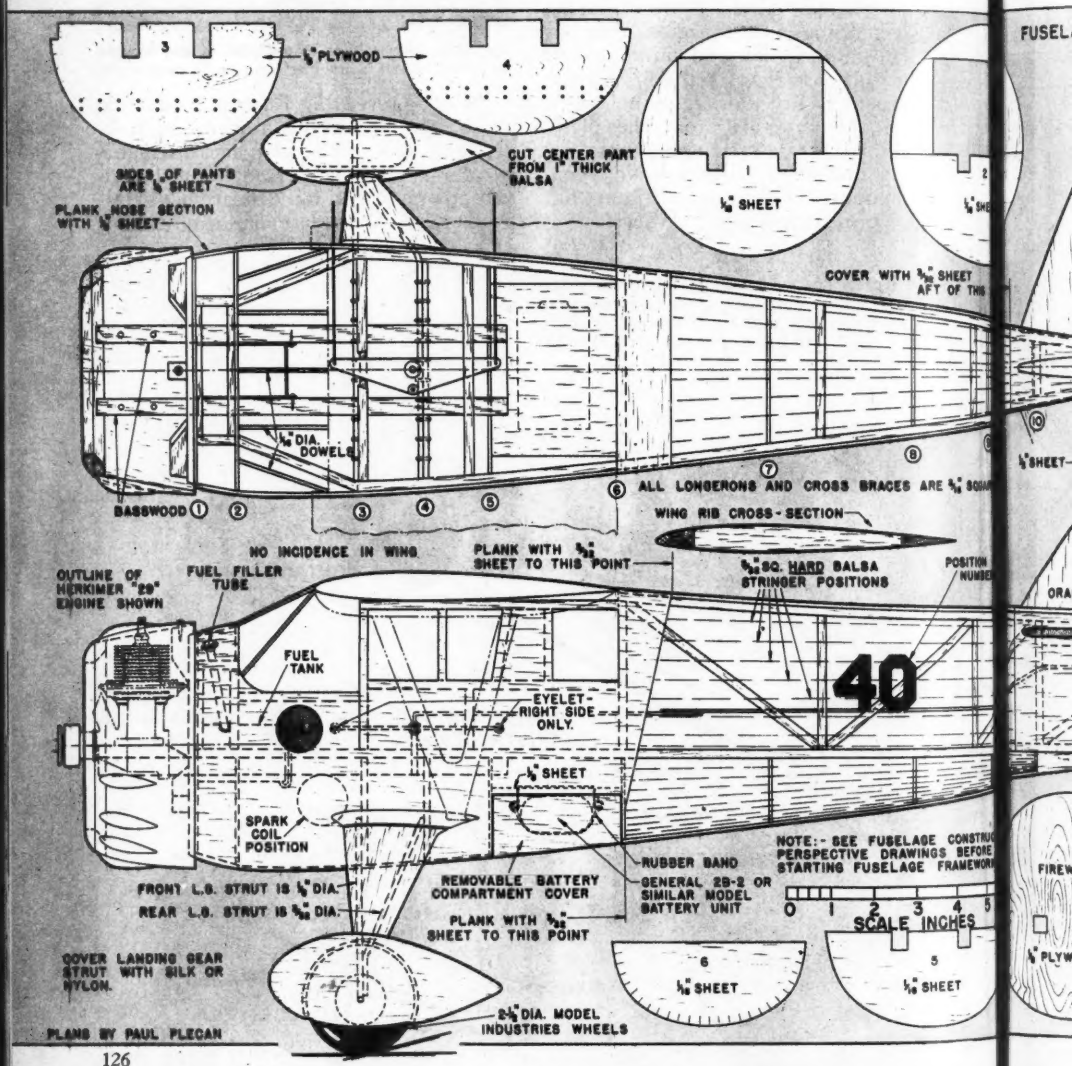
Entire construction is rugged yet within the reach of every novice modeler. Original model was finished pure white with black numbers and lettering. Note convenient position of fuel tank.



Merely alter the mount position to fit. Once the bulkheads are secure, form the landing gear and bind in place against bulkheads No. 3 and 4.

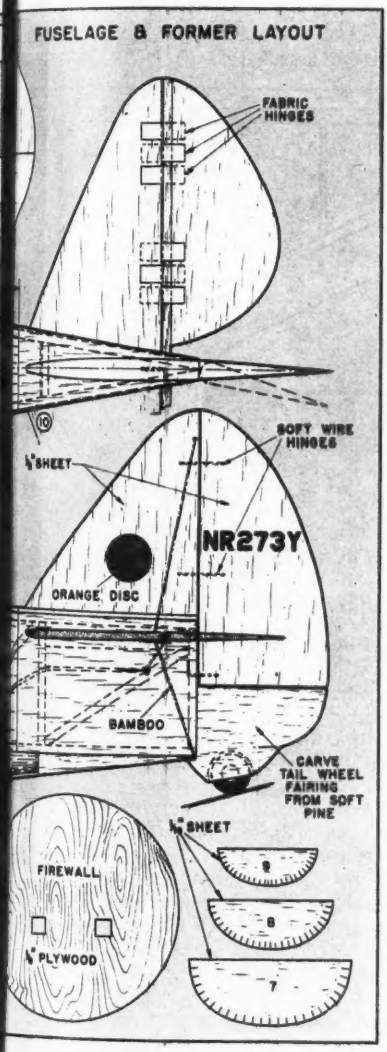
Dimensions for the front gear strut are shown in the right half of the front view drawing while the rear strut measurements are shown in the left half. After the gear is in place, install the ignition system and tank and then add the control mechanism. Mounting of the battery unit (wet cells or pack type), is left to the initiative of the builder. The battery rests between bulkheads No. 5 and 6, as shown on the plan. The removable hatch, which is held in place by large dress snaps, is carved from solid balsa and hollowed out.

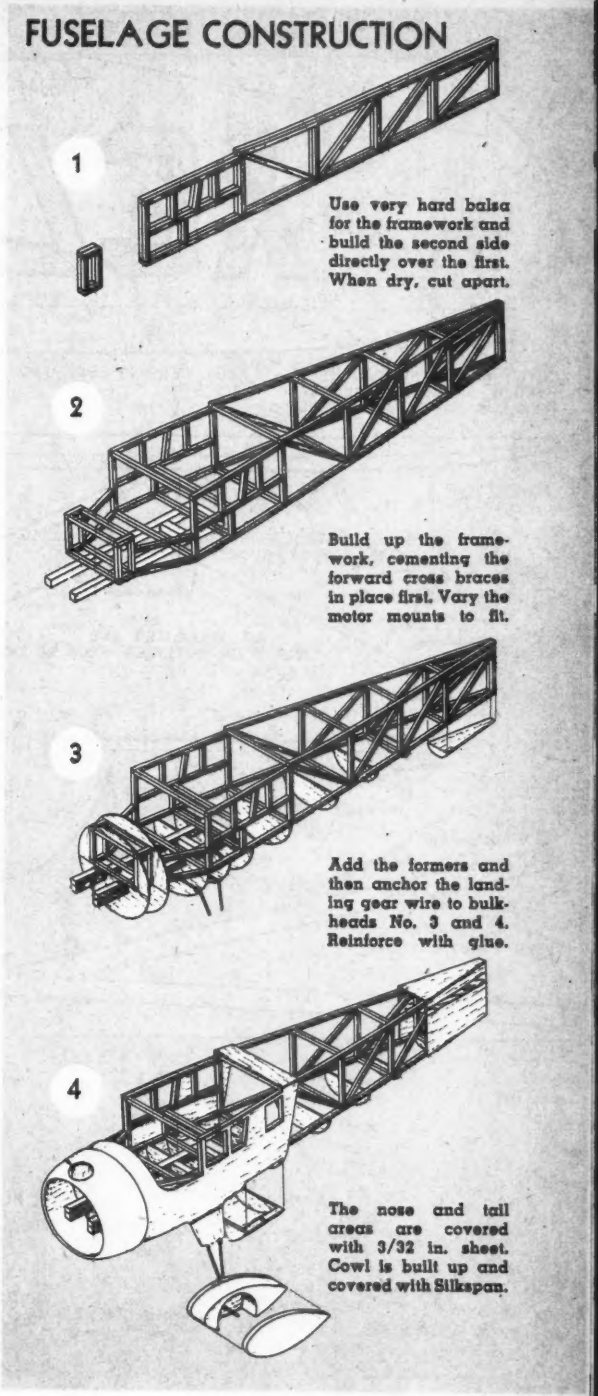
The nose is now planked with soft 3/32 in. sheet balsa. Use fairly wide pieces for the sides and narrow strips for the curved bottom. Allow the cement to dry thoroughly before planing and sanding the planked area smooth. The stabilizer is next cut from $\frac{3}{16}$ in. sheet and carefully sanded so the airfoil is symmetrical. Hinge the elevator as indicated and then mount the control horn. Cement the elevator in

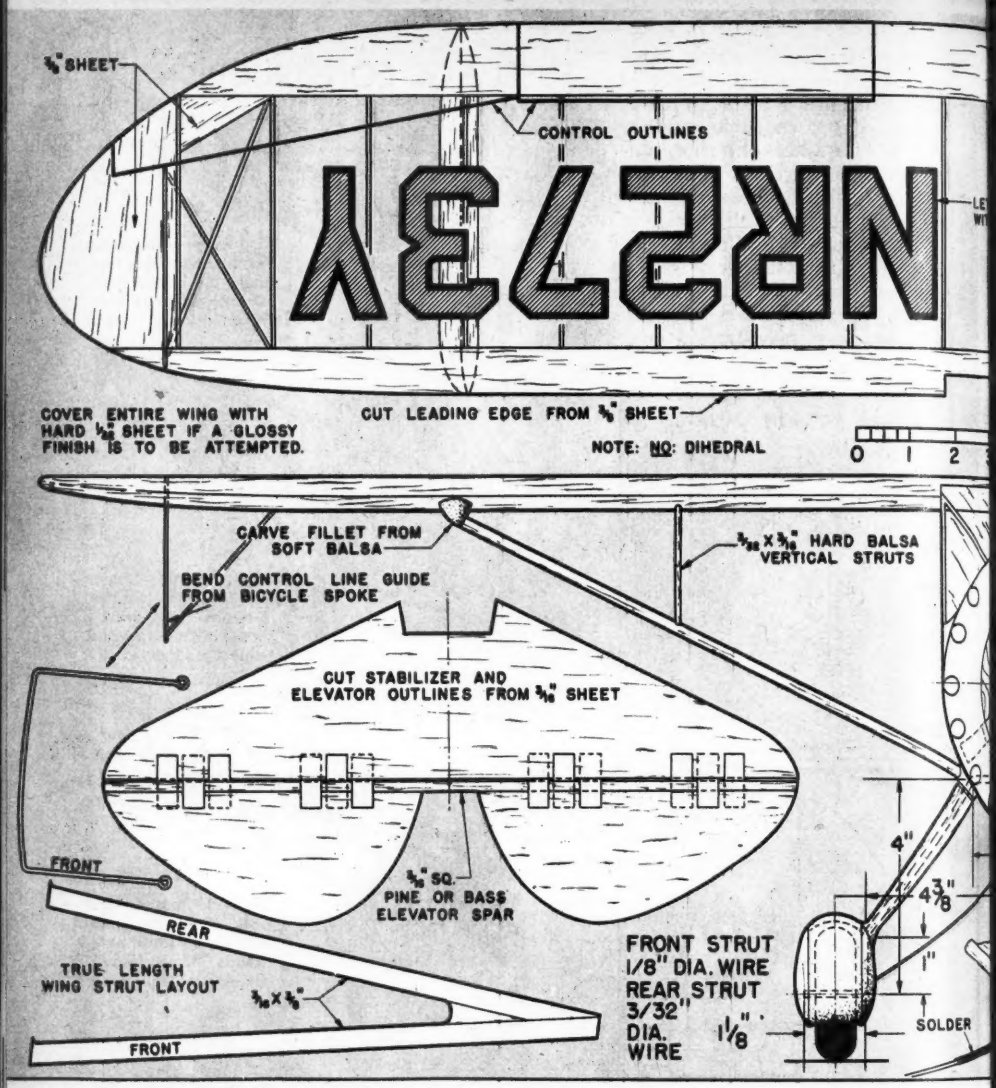


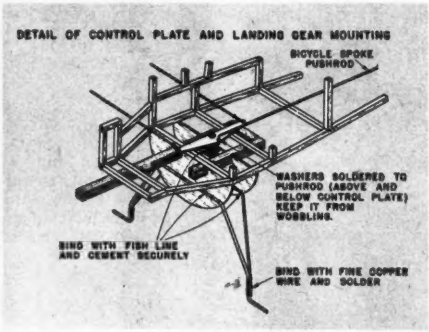
the slot provided, cutting away the rear covering and upright to permit slipping the unit in place. Finally cover the rear section with 3/32 in. sheet and then connect and test the control surfaces.

The 3/32 in. square stringers are next attached directly over the fuselage sides and bulkheads. In joining the stringers to the planked area, notch the latter about 1/8 in. to fit each stringer. The landing gear fairing and



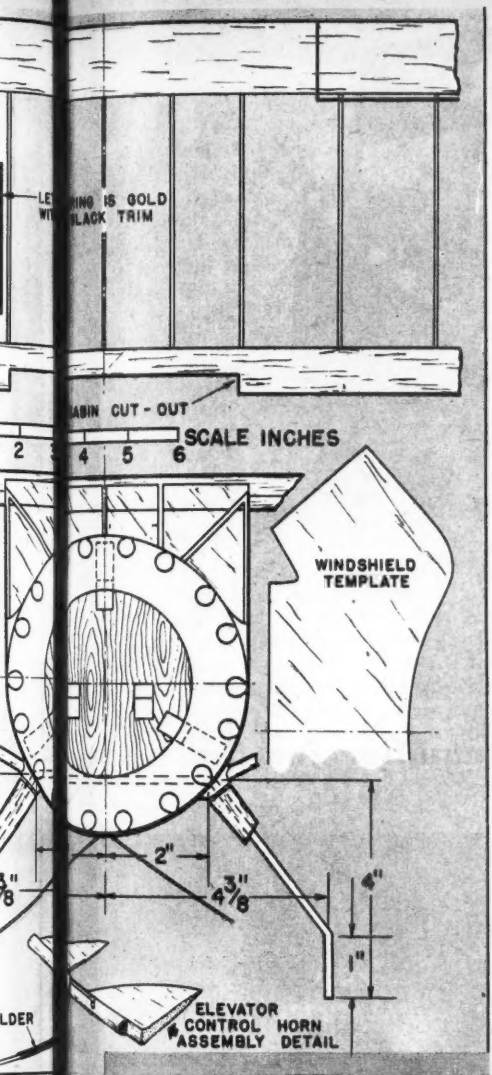




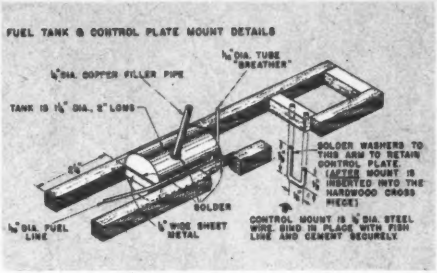


wheel pants are now built and carefully mounted to the legs. Note that a 1/8 in. space exists between the fairing and the soft balsa fuselage fillet, thereby permitting the gear to absorb shock.

Build the cowl next. First cut a balsa ring about 1/2 in. larger in diameter than bulkhead A and spot cement it to the firewall. Obtaining the exact measurement from the plan, cut the second nose ring and spot cement it to the motor mounts. Cover the edge of the firewall ring with Scotch tape and then plank



Full Size Plans—Page 140



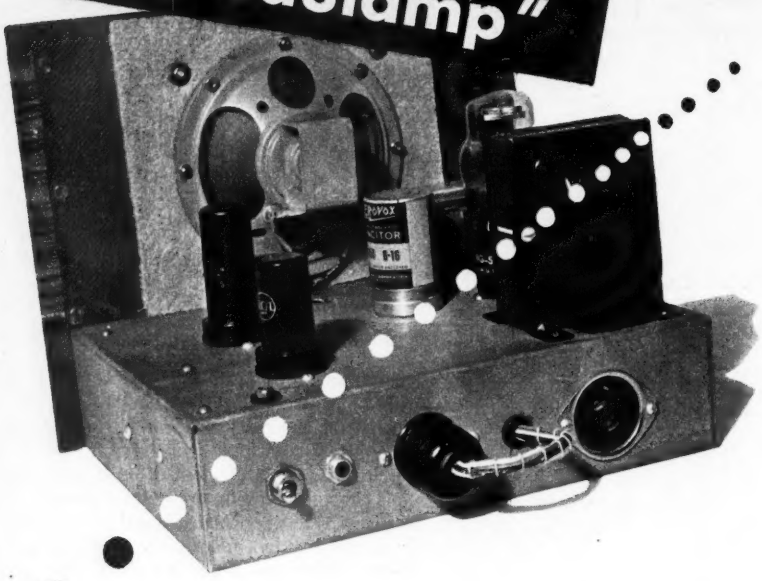
with medium grade 1/8 x 3/8 in. planking.

After the cement has dried, carve and sandpaper the ring so a smooth surface results. Next, cut the extreme front ring and cement in place. Round off the edge and then pry loose the entire cowl. Cut out the inside of the second disk, sand smooth and cover the inside and outside with Silkspan tissue. Now, cut loose the rear disk and your cowl is complete. Anchor three hardwood blocks at equal points on the firewall for the mounting screws and then cut away the cowl top for your engine.

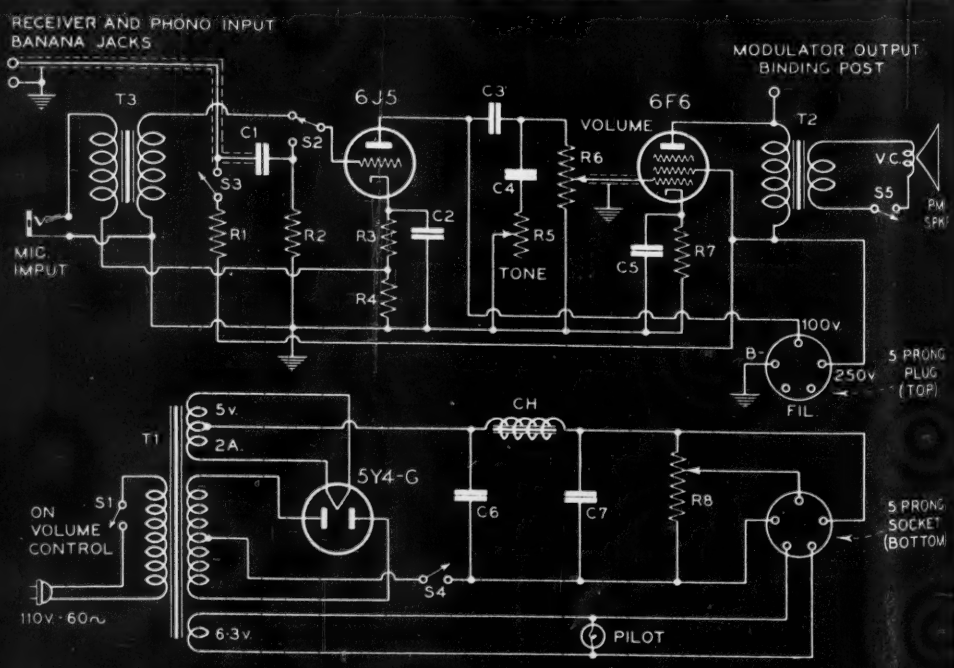
Wing construction is extremely simple. Cut the leading and trailing edges to shape, pin each edge directly over the plan and cement the ribs in place. The fact that the wing does not have any dihedral makes it possible to build the structure in one piece. Add the tips and line spreader and then mount the structure to the fuselage after the latter has been covered with Silkspan tissue. Covering [*Continued on page* 164]

Not the prototype Mr. Mulligan, merely the model photographed against a background of private and army aircraft. Two planes at right are Vultee BT-13s.

"modulamp"



combination modulator-amplifier for the ham



BY CLINTON CLARK (W1KLS) AND RICHARD PARMENTER (W1JXF)

AFTER the beginner has built his first receiver or two and has noted that the audio section is only too often a repetition of the same thing he will perhaps reason that it would be wise to have on hand a small audio amplifier. Similarly, the licensed radio operator who experiments with VHF oscillators soon realizes that a small four-to-eight-watt modulator is a valuable accessory to his workshop. With these concepts in mind, we present the Modulamp.

In addition to the above uses, the unit supplies a complete, well-filtered power supply which may be used as an integral part of an audio amplifier or may be disconnected by means of a plug so that it may be used independently. This unit will also supply B potentials and coupling components for a tuner, while at the audio end, the speaker, volume and tone controls are ready to use. A pickup may be plugged into a jack provided for the purpose and then the Modulamp will double as a record player. A microphone may be plugged in and the changeover from record to speech accomplished by throwing a switch. Since by the use of switches, almost any part of the circuit may be isolated, the builder will undoubtedly find other jobs for this versatile piece of equipment.

From the viewpoint of any one of its various uses, the circuit design is quite straightforward. The input tube, a 6J5 is merely a speech amplifier stage and provides ample gain to drive the output tube, a 6F6, to full capacity. By means of a switching arrangement, in the grid circuit of the 6J5, two input circuits are provided and one may be put to other uses.

While the circuit is basically simple some care should be exercised in wiring. In general, keep all grid leads as short as possible and shield them where indicated. While this may not be absolutely necessary it will forestall the possibility of feedback and coupling trouble. Filament wiring should be twisted and run around the edge of the chassis to keep it as far away as possible from other wires.

The chassis consists of cadmium-plated steel. Five 1⅛ in. holes are made, three on top of the chassis for the tubes and two in the back for the 110-volt input and the 5-wire cable. The layout as shown in the photo works out very nicely with the components used. The transformer, choke and filter condenser may be mounted on top of the chassis and the output transformer and microphone transformer below. The output transformer is in the center of the chassis and the mike transformer is mounted against the side panel.

Center the pilot lamp on the front of the chassis. The two SPST switches, S_4, S_5, and the volume and tone controls are then spaced symmetrically on either side. Holes that pass wires through the chassis should be protected by rubber grommets or spaghetti. [*Continued on page* 166]

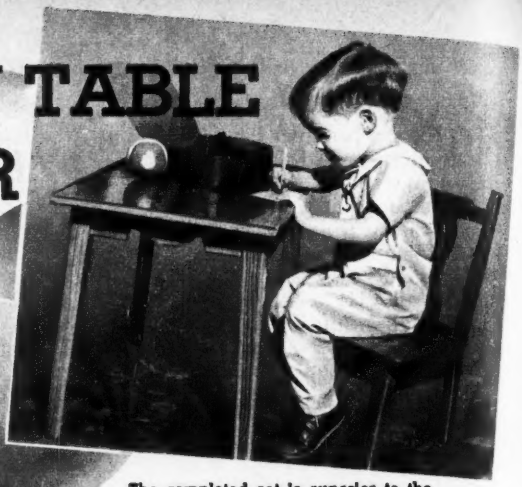
Chassis measures 8x10x2½ in. Single button mike shown requires no external battery for exciting.

Built-in jack permits the Modulamp to be used as an amplifier for use with a record player.

NURSERY TABLE and CHAIR

BY HAROLD JACKSON

Keep your child happy with this set patterned after grown-ups' furniture.

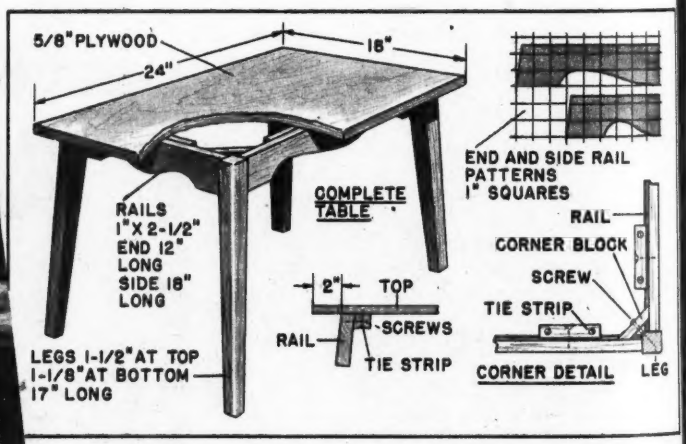


The completed set is superior to the store variety in looks and durability.

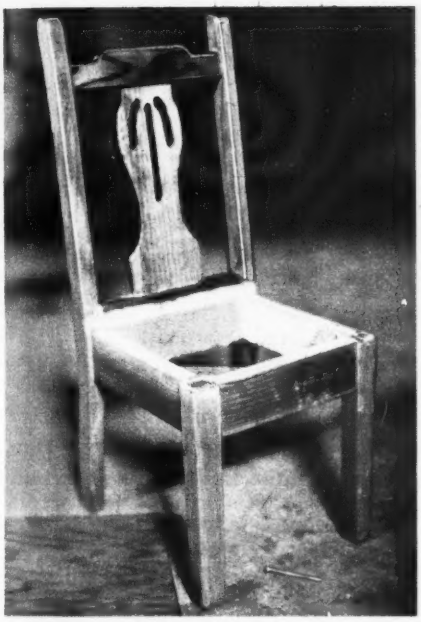
MOST children are happiest (and out of mischief) when their fingers are busy making cutouts, coloring or doing any of the many things that interest them. With this attractive table and chair set that's been especially designed for their use, you'll find it's much easier to keep them amused for hours on end. Not to mention the fact that they'll be out of your hair as well.

The construction of the set is simple and with the aid of the detailed drawings there should be no difficulty with it. The first piece to be made is the table which has a plywood top, curved side and end rails, and tapered legs held in place by lag screws. After the top has been cut to size and the corners slightly rounded, make paper patterns for the scrolls on the rails. By folding the paper before cutting, both ends of the pattern will be exactly alike. Transfer the patterns to the material and after cutting the rails to shape, cut the ends at an angle of 85° to give the legs a slight flare. Next, cut the 1 in. square tie strips, then glue and screw them to the rails as shown in the drawing. The corner blocks are made next and fitted in place. Following this, cut out the material for the legs, giving them the taper indicated. The legs are attached by using ¼ by 2½ in. lag screws. The last step is to glue and screw the table top in place.

Legs and rails assembled before attaching the top. Note the lag screws used to fasten the legs in place.

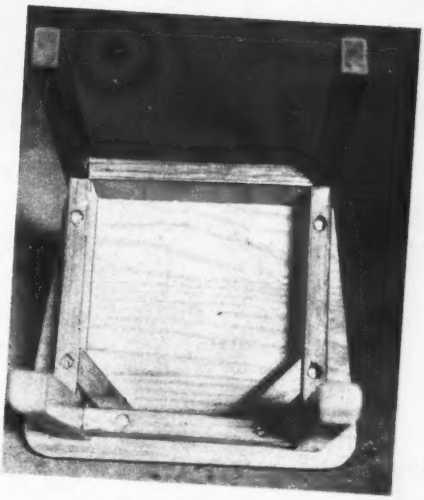


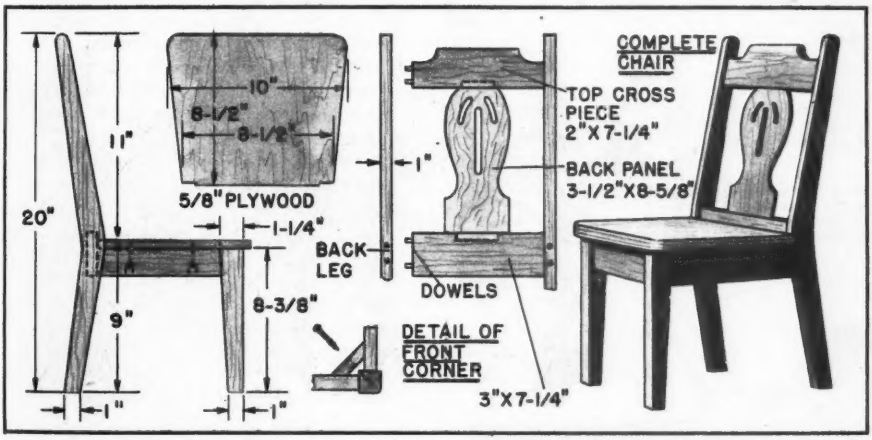
To start the ball rolling on the chair, cut the back legs first so that they curve 1¼ in. from a straight line drawn from top to bottom. The high point of this should be about 9 inches from the bottom. Next, cut the back panel to shape and jig out the open work. The upper and lower cross pieces are then made with mortises cut in them to hold the panel. After this has been glued in place, the cross pieces are fastened to the back legs, using glued and doweled joints. The seat board is then cut to shape from plywood, following the drawing. The next step is to make the front and side rails. The seat is glued to these later and fastened with 2¼ in. No. 7 wood screws, running up edgewise. The rails are then glued to the back legs, using doweled joints. Following this, cut the front legs to shape and attach to the rails by means of corner blocks and screws. The seat board is then fastened in place. Finish the set by sanding and varnishing.



Left: Chair ready for the seat to be fastened in place. Screws in front will run through side rails.

Below: Bottom view of the completed chair. Corner bracing on front legs is similar to that on table.





TREE CONSERVATION

Trees, the highest form of plant life, often need a helping hand to keep them growing.

BY J. MODROCH

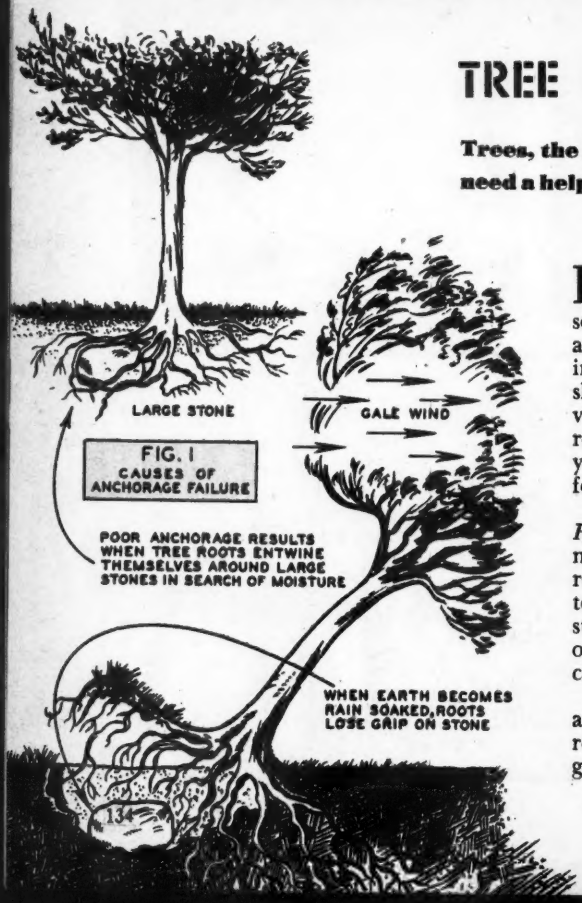


FIG. 1 CAUSES OF ANCHORAGE FAILURE

HEALTHY trees prevent soil erosion by absorbing flood water; serve as natural landmarks, borders and backgrounds that give beauty and interest to a homesite and provide cool shade for hot weather comfort. These valuable property assets are yours in return for the help you should give your trees in their ceaseless struggle for existence.

Correcting and Preventing Poor Root Anchorage. One of the essential needs of a tree is firm anchorage for its roots. Its grip on the earth must be able to resist the uprooting force of a storm-lashed wind. A tree incapable of offering this resistance is a potential casualty during a storm.

Young trees with poor anchorage are not easy victims, as they offer slight resistance to the wind. But, as they grow larger and their foliage increases,

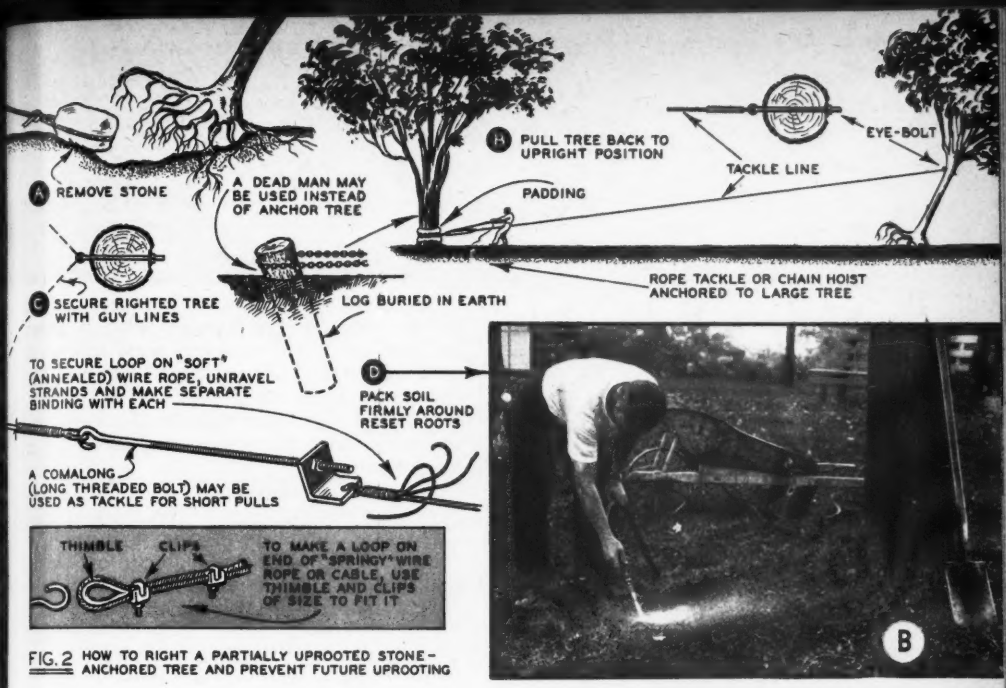


FIG. 2 HOW TO RIGHT A PARTIALLY UPROOTED STONE-ANCHORED TREE AND PREVENT FUTURE UPROOTING

the resistance they offer becomes greater than the strength of their anchorage and their chances of standing are steadily reduced.

Poor anchorage may result from a number of soil conditions; a large stone embedded in the topsoil is one of them. Because a stone retains moisture longer than the soil, the roots of a nearby tree naturally entwine themselves around it. This condition provides adequate anchorage for the tree while it is small and the pull on the roots during storms is slight. But, when the tree reaches an appreciable size the pull on the roots exceeds the strength of their grip on the stone. They

A EXAMPLE OF ANCHORAGE FAILURE OF TREE ROOTED TO BASE STONES OF WALL

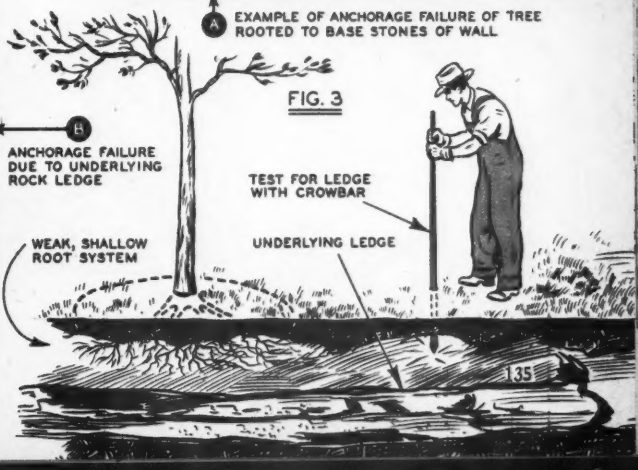


FIG. 3

FIG. 4

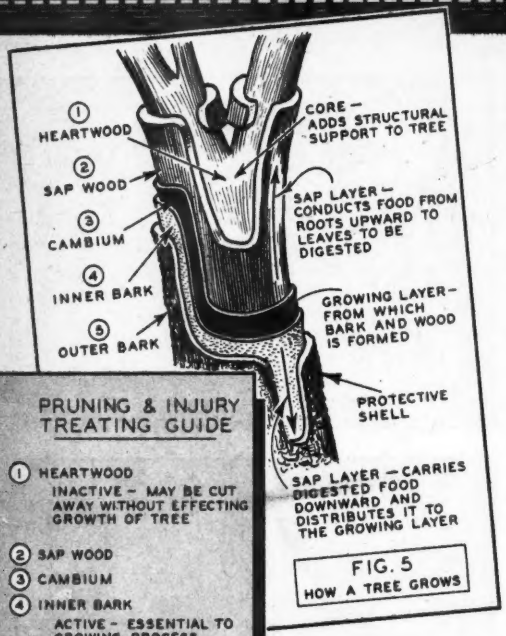


FIG. 5
HOW A TREE GROWS

let go and the tree topples. This is most likely to occur when a severe wind follows a prolonged rain. The valuable black walnut tree shown at the top of page 134, A, is an example of a windstorm casualty. Its roots, on the windward side, were anchored to a large stone.

To right a stone-anchored tree that has been partially uprooted in this manner and to prevent future uprooting, first remove the stone. If the tree is of medium size it may be possible to pull it back to an upright position with a rope tackle, but a chain hoist and cables are likely to be required for large trees. Pull the tilted tree up in easy stages to allow the exposed roots to settle gradually.

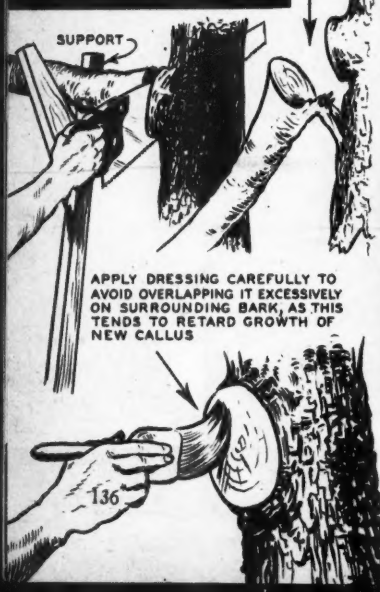
After the tree has been pulled upright, secure it in place with two or more guy lines and remove the tackle line. Next, slice off the turf around the base of the tree, set it aside, and pack the roots with good topsoil into which about 50 lbs. of tree food has been mixed. Use plenty of water to compact the soil around the roots, photo B. Finally,

PRUNING & INJURY TREATING GUIDE

1. HEARTWOOD
   INACTIVE – MAY BE CUT AWAY WITHOUT EFFECTING GROWTH OF TREE
2. SAP WOOD
3. CAMBIUM
4. INNER BARK
   ACTIVE – ESSENTIAL TO GROWING PROCESS
5. OUTER BARK
   INACTIVE – BUT NEEDED FOR PROTECTION OF INNER BARK

SUPPORT HEAVY LIMBS TO AVOID STRIPPING BARK, WHICH RESULTS IN SLOW-HEALING WOUNDS

FIG. 6 PRUNE CORRECTLY TO PROMOTE FAST-HEALING WOUNDS



MAKE CLEAN CUTS TO ENCOURAGE UNIFORM GROWTH OF CALLUS OVER WOUNDS

LEAVE NO DEAD STUBS THROUGH WHICH DECAY CAN MENACE ADJOINING LIVING PARTS. CUT BROKEN BRANCHES BACK TO FIRST VIGOROUS SHOOT IN SLANTING MANNER SHOWN ABOVE

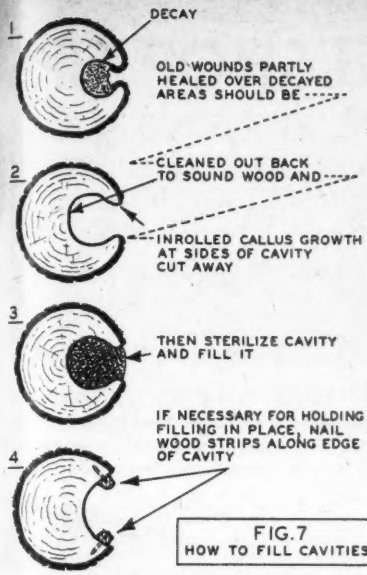


FIG.7
HOW TO FILL CAVITIES

A neglected tree is a potential menace to the entire area surrounding it. In this case a canoe was needlessly lost.

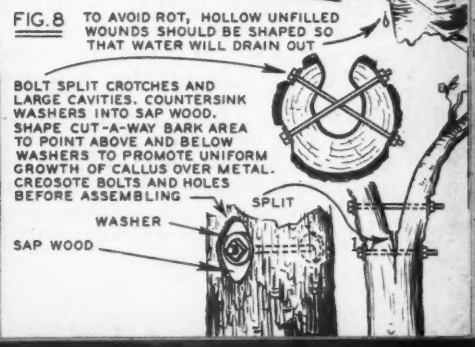
CANVAS, CLOTH OR SHEET METAL COVERS ALSO MAY BE USED TO HOLD FILLINGS IN CAVITIES. PAINT COVERS AND SEAL JOINTS WITH ASPHALT TO MAKE INSECT-TIGHT AND WATER-TIGHT

replace the turf and roll it level. Keep the tree anchored for several years until the damaged roots have become thoroughly re-established.

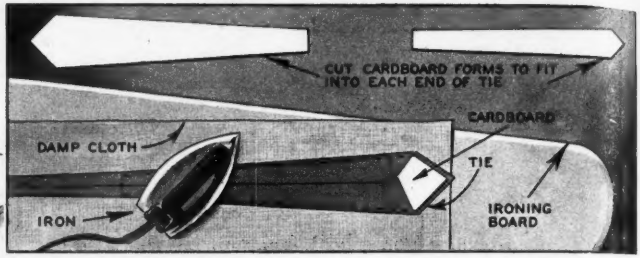
Photograph C tells another story of anchorage failure. In this case the tree had anchored its roots on one side to the base stones of a stone wall and, after growing to sufficient size, broke out the wall when caught in a gale. To guard against damage of this kind, don't build a wall close to a seedling that you wish to save, and don't let a seedling grow up beside a wall already built. Fast growing trees, such as eucalyptus and locust, having [*Continued on page* 160]

These ice storm photos show why young trees, due to their resilience, are less liable to damage than large trees when weighted down with ice. Sound crotches and limbs aid large trees in weathering severe storms.

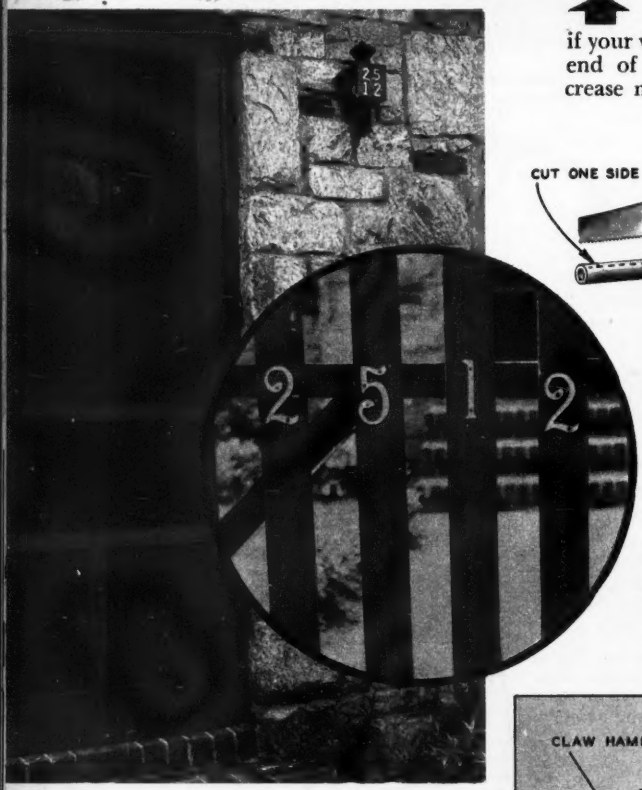
FIG. 8 TO AVOID ROT, HOLLOW UNFILLED WOUNDS SHOULD BE SHAPED SO THAT WATER WILL DRAIN OUT



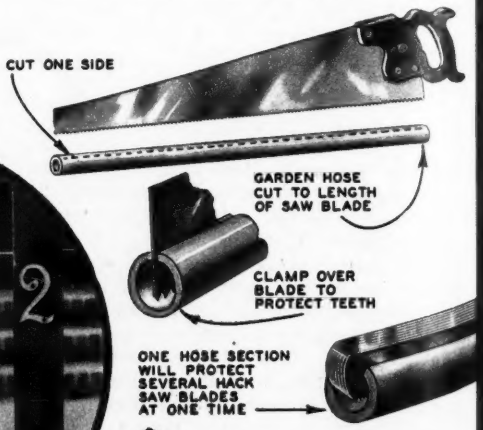
HOME and SHOP TIPS



PRESSING TIES is no problem if your wife uses a cardboard form at each end of the tie. This avoids the usual crease marks caused by the inside folds.

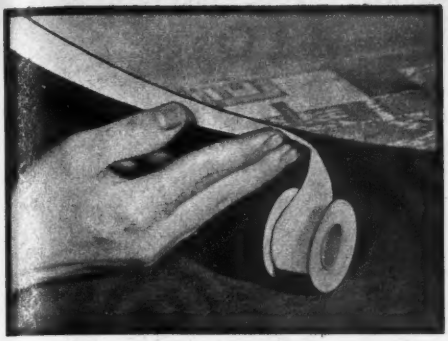


METAL HOUSE NUMBERS can be cut from aluminum scraps, using printed numbers as guides. To increase visibility, give the numbers a sanding.

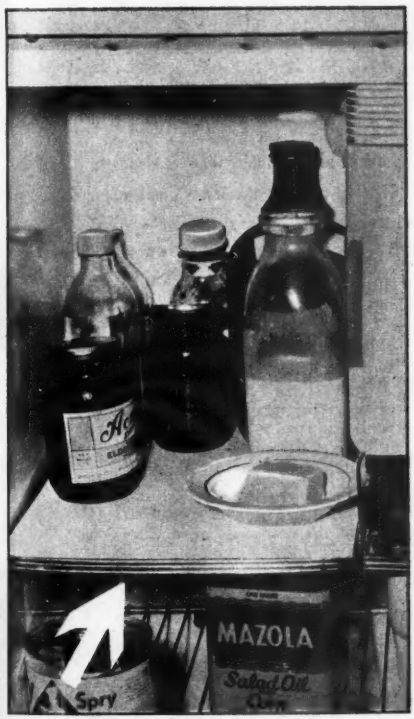


SAW TEETH can be easily protected by using a short section of old garden hose with a slit cut in one side to fit over the blades as shown.

LOOSE HAMMER HEADS are a menace so why not tighten them up by screwing a small lag screw into the wood? This beats the ordinary metal wedges and bent-over nails sometimes used because you can tighten the screw when necessary.



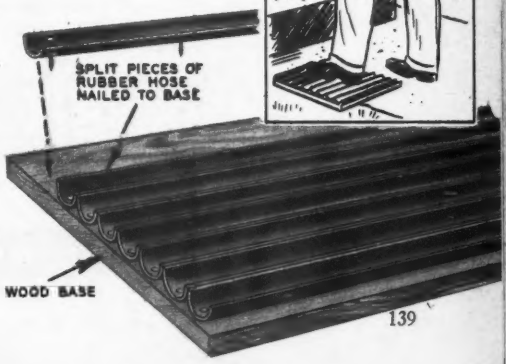
LINOLEUM EDGES will tear less if you strengthen the backs of them with wide width adhesive tape. If one layer doesn't do the trick, add a few more.



REFRIGERATOR INNARDS will stay cleaner longer if you use pieces of heavy white cardboard under the shelves to prevent bottles and jars from spilling. Food stains show up easily on the white cardboard and if it has a smooth surface it can be wiped with a damp cloth several times before replacing.

DRAWING NAILS without scratching the wood is possible if you use this device made from hardwood scraps. It will take spikes up to 4 or 5 in. in size without a lot of fuss, or loss of tempers.

A DOORMAT that costs only your labor can be made from the rest of that hose you used for the saw sheath opposite. The split pieces of rubber really remove dirt and mud quickly and easily. A coat of black paint will add to the appearance.



MEET MR. MULLIGAN

An actual photo of a gas model of the famous "Mister Mulligan". . . built from MECHANIX ILLUSTRATED plan No. 374

Watch for this package at your hobby shop. It means MECHANIX ILLUSTRATED plans . . . the latest and best in gas powered model airplane plans. Only 50 cents

Here's a super control-line model that flies as well as its full size counterpart—winner of the Bendix and Thompson Trophy Races in 1935. Be sure to read the complete introduction to "Mister Mulligan" on pages 124-129 of this issue.

Rugged construction, classy appearance and excellent flying characteristics make this flying model one that you'll be really proud of. And whether you're a beginner or an expert you'll have no trouble building "Mister Mulligan" from the MECHANIX ILLUSTRATED plans—now available at your hobby shop.

Each month, thousands of dealers all over the country are stocking the latest in the MECHANIX ILLUSTRATED model series. These full size plans are complete to every last detail of construction including a list of the materials needed, exploded views and easy-to-follow instructions.

So for the most fun in building and flying model airplanes, ask at your hobby shop for the MECHANIX ILLUSTRATED plans. If your dealer can't supply you, send 50c to Fawcett Publications, Greenwich, Conn., but be sure to include the name and address of your dealer.

MECHANIX ILLUSTRATED

A FAWCETT PUBLICATION

PIONEERS IN THE MODEL BUILDING FIELD

Build with MI PLANS

BONNIE, 18' V-bottom auxiliary sloop. Plywood construction, seaworthy. No. 944, $3.00, (with full-sized patterns, $7.00).

MALLARD, 14' plywood hunting or fishing boat. Optional rowing or outboard hulls. No. B-143, $1.00.

TESTED BOATS

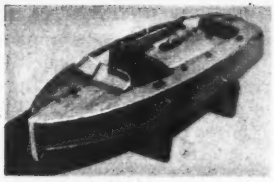
Scale Blueprints

SCRAM III, 16' inboard designed to take a model B Ford marine conversion engine. Simple plywood construction throughout. No. 936, $1.50.

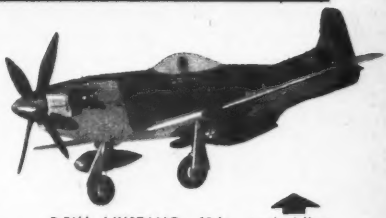
FLYER, 12' outboard utility. Uses 1 to 10 h.p. engine, speeds up to 20 mph. No. B-142, $2.00.

TESTED MODELS

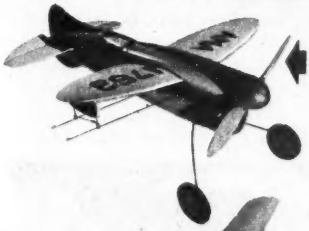
Full Size Plans



BOUNCIE, 32-in. speedboat. Easy to build, takes any engine. Plans also contain instructions. No. 362, 50c



P-51H MUSTANG, 32-in. control-line job features removable landing gear, take-off dolly. Realistic, easy to build and fly. Plans, instructions, No. 364, 50c.

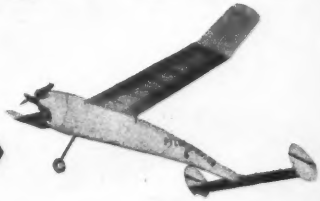


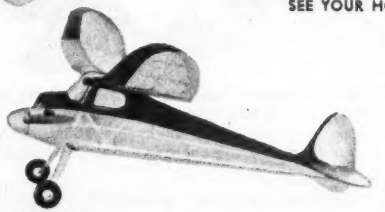
DOODLEBUG, 95 mph 16-in. control-line speedster-trainer ideal for either beginner or expert. Takes any A or B engine. All around performance. Plans contain instructions. No. 365, 50c.

SKYSEDAN, 36-in. super-scale control-line model of the new Piper private plane. Power with any class engine. Plans contain instructions. No. 370, 50c. SEE YOUR HOBBY SHOP FIRST!

NAVION, 36-in. scale control-line model of North American's new lightplane. Tricycle gear prevents broken propellers. Simple construction. Plans contain instructions. No. 369, 50c.

PYLON BUSTER, 82-in. free-flight Class C contest winner featuring a most unusual aerodynamic force arrangement and an automatic glide control mechanism. Plans contain instructions, No. 378, 50c. SEE YOUR HOBBY SHOP FIRST!





SNOOTIE, 40-in. Class A free-flight contest job designed for the Arden .099 power plant. Complete plans and instructions. No. 370, 50c.

Address All Orders To:
FAWCETT PUBLICATIONS, INC.
GREENWICH, CONN.

Enclosed is $..... for which send me the following plans, postpaid .....

Name .....

Street & No. .....

City & State .....

No C.O.D. orders, foreign stamps or foreign coins accepted
2-47

The plans listed on this page are only a few of the many MI publishes. Send a 3c stamp for the new 100 project MI PLAN BOOKLET.

car care

THE old adage of a stitch in time saving nine is also applicable to motorists. Did you ever stop to think that every squeak in your car, if not attended to, will sooner or later develop into a rattle?

A SLUGGISH WINDSHIELD WIPER may merely suffer from a leaky hose but if that's not the trouble it's a good idea to assume that the wiper valve may be sticking. Tap the wiper motor control box with the handle of a screwdriver. This sometimes relocates the valve.

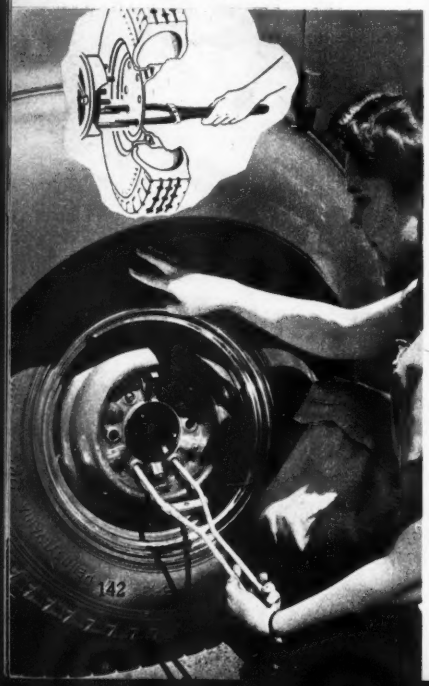
AN ODD CLICKING in the car on a mild winter day may indicate irregular pressure because of too thin oil. Don't change to a heavier oil or you will have trouble starting on cold mornings. But, be sure the oil isn't diluted with gasoline and water from condensation.

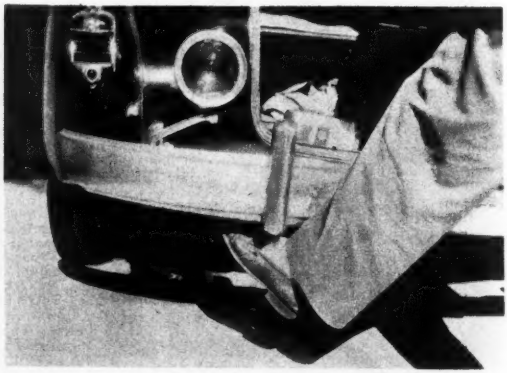
ELECTRICAL SHORTS often are found in the wiring which runs through the luggage compartment. Its installation is easily damaged by contact with luggage and tools carried in the compartment.

A REAR AXLE NOISE usually calls for readjustment of the pinion and ring gear mesh, but if this fails then check for loose side bearings in the differential.

A PAIR OF PARTS, under ordinary conditions, always should match if you buy them from an official parts department. But, with the pressure put on suppliers these days there may be some variation. Reader W. C. M. bought two brake drums, but saved himself a real headache by noting that they didn't match.

CLUTCH SHAFTS suffer on some cars because of failure to grease front fitting.



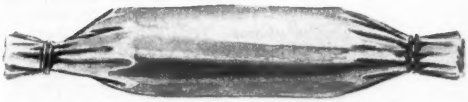


EXHAUST SOUND. Old timers listen to the sound of the exhaust by placing a foot partly over tail pipe with engine idling. Restricting exit of gases makes exhaust sound sharper and thus individual firing charges are more apparent.

WHEEL CHANGER. Flats are never a pleasure but they'll be a little easier to change with this handy device. Called the "Easy-Lift Wheel Lifter" it is designed for use with a lug or bolt-hole type drum. The T. E. D. Corp. of Cal. makes it.

RUINED ENGINE BEARINGS may be the penalty for failure to keep the top of oil filter tight. If it loosens engine will lose all of its oil in a short distance.

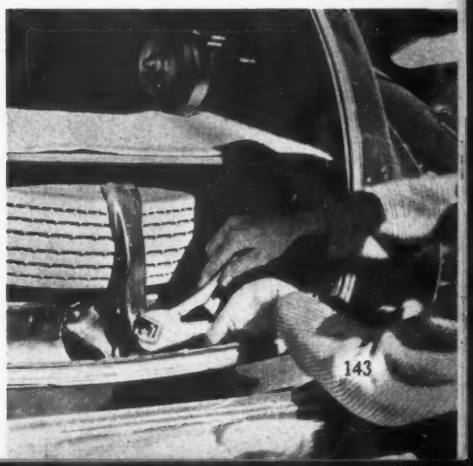
BY FREDERICK C. RUSSELL



Skid chains can be stored very nicely in a section of old inner tube. Tie one end with a stout cord, drop the chains in and tie up the other end.

A DAMAGED GREASE FITTING because of careless jacking cost reader J. M. McB. a new knee-action bushing. Gas station attendant was skipping it when greasing the car.

THE SPARE TIRE can be weakened by a too tight tire clamp. It is a good idea to turn the spare occasionally so that the pressure will not always be in the same spot.



BEHIND THE WHEEL WITH FRED RUSSELL

If you want a personal reply from Mr. Russell please include a self-addressed stamped envelope.

I took the transmission cover off my 1936 Chevrolet and now I can't get it out of gear. Can you help me? Clyde S Cochrane, Los Angeles, Cal.

To get the gears back into proper relation again for normal shifting take off the transmission cover and lift out the shift lever and shifter forks. Set the shift lever in the neutral position and move the sliding gears so that when the shifter forks are slipped over them they will be in a demeshed position.

The water comes out of the overflow pipe every time I gun the engine. The water pump is new, I don't use a thermostat and the radiator has been cleaned out. I notice a few small cracks around the exhaust valves on the cylinder head. Do you think they could be causing the trouble? R. Thomas, Defiance, Ohio.

If the water spurts out as you say, then the chances are that a cylinder head gasket leak is causing the trouble. A collapsed lower water hose will also show this symptom, but the action is a slower one.

What grade of oil should I use in my 1946 Dodge? The factory recommends No. 10 for the first thousand miles and after that No. 20 oil in the summer. My dealer tells me to use No. 10 all the time. What is your advice? D. Deyo, Newburgh, N. Y.

It is entirely practical to use No. 10 all the time, provided you do not drive too fast. If you have the model with the fluid drive though, you should use No. 20 oil in the summer.

What causes my 1936 Packard to overheat? It has been completely overhauled with new rings, timing chains, hoses and bearings. T. E. Quarry, Costa Mesa, Cal.

Overheating may be due to a leaky head gasket because of head warpage, late ignition timing, wrong grade of oil, clutch slippage, or dragging brakes. Have you checked to see whether the lower radiator hose has a coil spring to prevent it from collapsing? Also, how about the thermostat? Check all of these and if you still have trouble write me again.

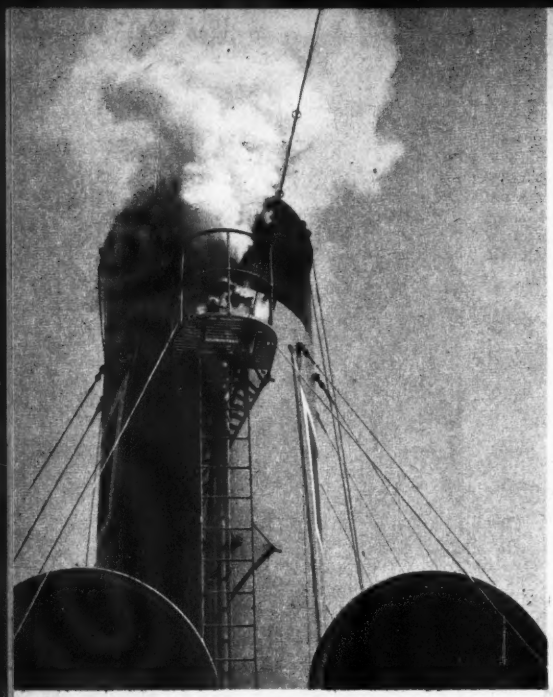


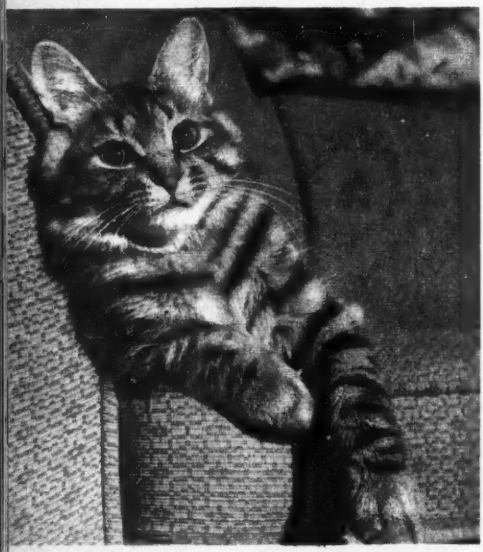
Photo Contest

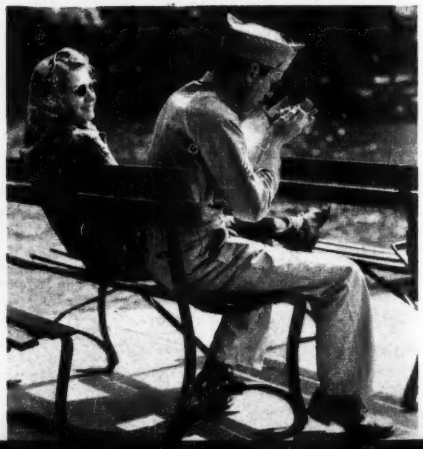
MONTHLY PHOTO CONTEST RULES
Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Photo Contest Editor, MECHANIX ILLUSTRATED, 347 Madison Ave., New York 17, N. Y.

1st Prize, $10.00 .....All Aboard
Taken with a Kodak Six-20 Vigilant; 1/100th at f-16, by A. T. Ankenny of Culver City, Cal.

$5.00 Award .....Butch
Speed Graphic shot, 1/100th at f-8, Super Pan Press film, by L. W. Jenkins, Vallejo, Cal.

$5.00 Award .....Her Feline Majesty
A flash exposure enlarged from a 35mm negative by Kenneth Balharrie of Ottawa, Canada.

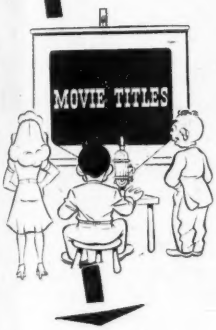




$5.00 Award .....Pardon My Smoke
Graflexed at 1/200th, f-6.3 on Super XX film by Leon Cantrell of Nashville, Tennessee.

PROFESSIONAL MOVIE TITLES

Why not use titles with your films instead of explanations to your guests?

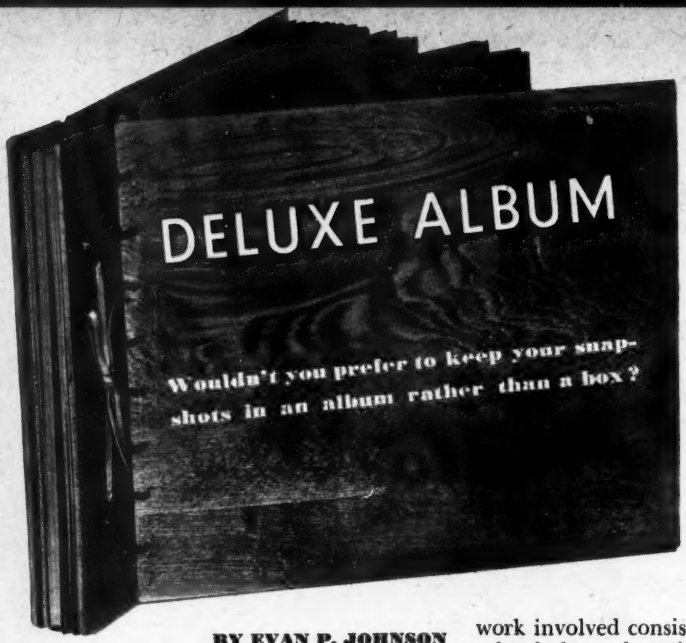


SERIOUS workers in 8mm and 16mm movies have long realized that titles with a professional appearance definitely lift their productions out of the amateur class. It would seem logical then to pattern titles after those which appear on the screens of local theaters. Even the casual observer soon discovers that most introductory titles superimpose the letters on a picture background. Backgrounds can be made by contact printing or enlarging from any suitable negative. However, a problem arises if you do your own title processing by developing the film to a negative. With such processing, picture backgrounds become negatives on the screen.

Here is how you can get a positive pictorial background for your titles even though you are processing your titles to a negative.

The illustration at the bottom of the page was made by the direct projection of a 35mm Kodachrome transparency on enlarging paper. The words "Silver Lake" were made by placing cutout letters on the paper during the exposure. The results, as you can see, consist of white letters on a negative background. To get a positive picture background on the screen, all you have to do now is photograph the print with your movie camera. In other words, use it just as you would a title card.

Using this picture as a title card the letters will project black with a positive background on the screen.



BY EVAN P. JOHNSON

PROFESSIONAL and amateur photographers will quickly recognize the desirability of this album. For the beginner, in photography, it is especially useful for here is an ideal place to put those pictures—not in a shoebox or bureau drawer as so often happens when we keep putting it off.

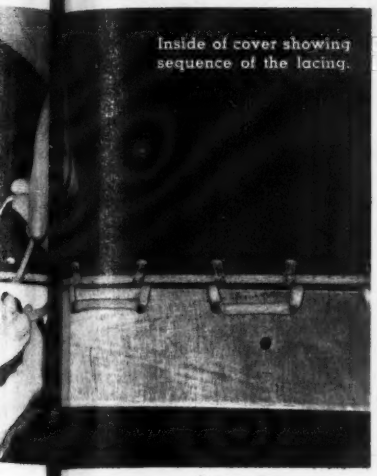
This album is especially strong and will withstand considerable abuse. Its unusual appearance will add interest and charm to any well-appointed room. A glance at the illustrations show that the work involved consists of merely drilling a few holes and cutting the covers to size.

The covers are made from ¼ in. maple plywood and measure 18x24 in. The outside of the covers are finished with stain and wax, while the insides are painted in chinese red. This combination, with the black album leaves, is unusually attractive.

The hinge strip, 3 in. wide, is cut from the 24 in. length. The lacing holes are ¼ in. spaced 2 in. apart and 2½ in. in from the edge. They should be carefully drilled and accurately located and then chamfered lightly to remove the rough edges. Each piece should then be sanded to a smooth satin finish on all sides, finishing up with a No. 00 sandpaper. The edges especially, should receive close attention since these will have saw markings that must be completely removed. When this is finished the pieces should be wiped free of dust and the best surfaces selected for the outer sides of the covers. Go over them with a sponge or cloth soaked with walnut oil stain. Rub this in well and after obtaining a uniform color, wipe off any excess stain and allow to dry.

Next apply several coats of hard wax and rub in well. The result will be a hard durable surface with an accentuated grain and a beautiful color. The inside

Filler strips are inserted between alternate leaves. Album can be expanded as required.



Inside of cover showing sequence of the lacing.

End of lacing doubled into last hole and secured under last loop.

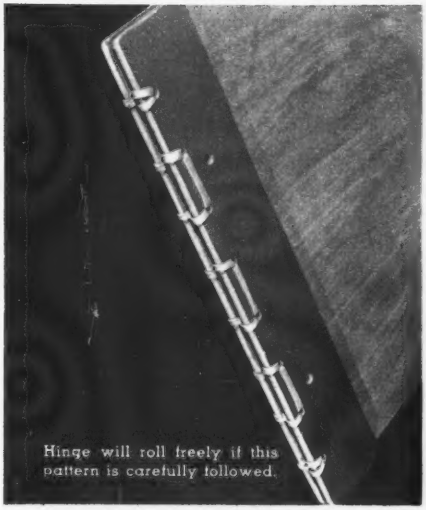
can then be painted with a quick-drying enamel.

The making of the hinge is not difficult if you study the illustrations carefully. The material used is ¼ in. belt lacing. This should be thoroughly cleaned by wiping it with a cloth moistened in cleaning fluid. Lacing can be obtained from a hardware or harness shop. It must be remembered that only a lacing pattern of the type shown will permit the covers to hinge freely without binding.

The leaves are made from ordinary album stock sold by all photo supply and stationery stores. Filler strips are inserted between every other leaf. The holes in the filler strips and the leaves can be drilled by clamping them firmly between two boards and drilling through boards, strips and leaves.

The binding of the back part of the cover can be done with a piece of lacing, as shown in the lead photo. Or, if you prefer, the album can be bolted together. Special album binding bolts of various lengths are available from stationery supply stores. Either method is good and permits adding additional leaves as your prowess as a photographer grows. The best way of mounting the pictures on the album leaves is by applying a bit of glue to the corner of each print.

Now that you are finished you'll really enjoy thumbing through this album. A good deal more interesting than up-ending a shoe box, isn't it?



Hinge will roll freely if this pattern is carefully followed.

Album is large enough for clippings and enlargements.

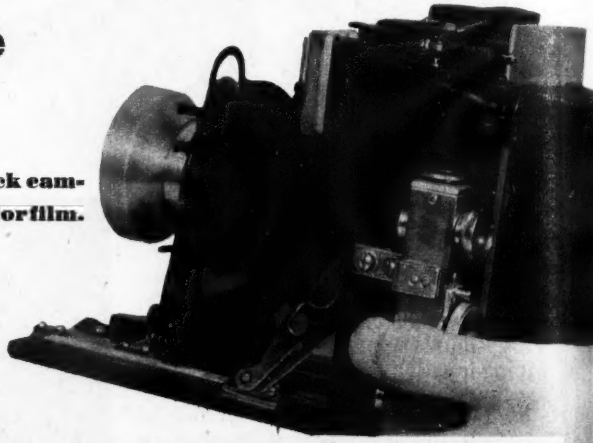
CAMERA fans with plate-back cameras need not confine themselves to shooting expensive Kodachrome or Ansco Color cut film. With a little ingenuity you can convert your camera to use 35mm or Bantam-size Kodachrome for slide projection. In a few hours' work you can build an adapter for these miniature film, regardless of your camera's size, thus extending its usefulness. Furthermore, you can quickly convert from large black-and-white cut film to miniature color film on the spot, thus eliminating the necessity of carrying two cameras.

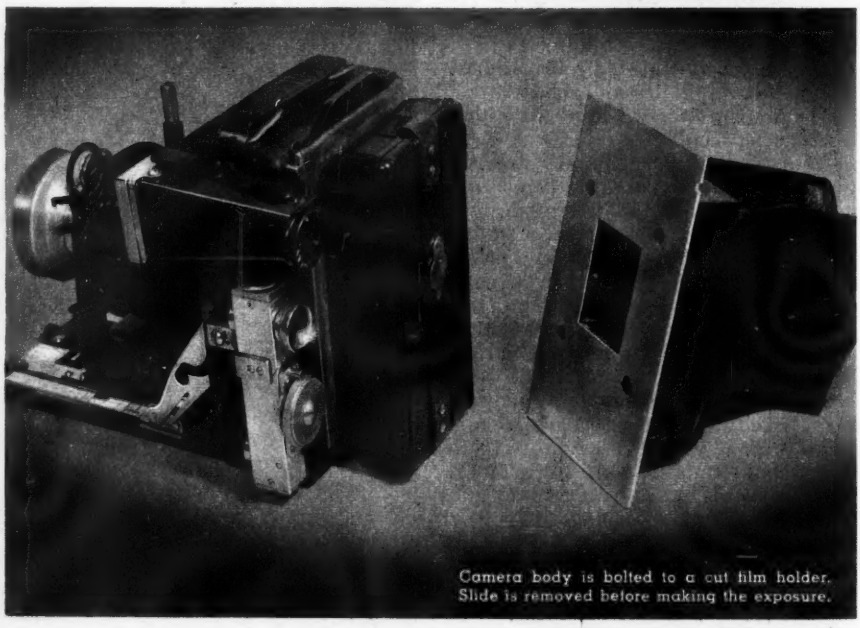
The camera I used in constructing my adapter is a Falcon which cost me $3.00. There are other inexpensive makes on the market which use 35mm or Bantam-size film that you can use just as well. Or, if you prefer, you can use one of Eastman's low-priced Bantam cameras such as the one with the f-8.0 lens.

The first step is to cut the lens mount from the body of the camera leaving only

Kodachrome *Adapter*

Converting a film pack camera to use Bantam color film.





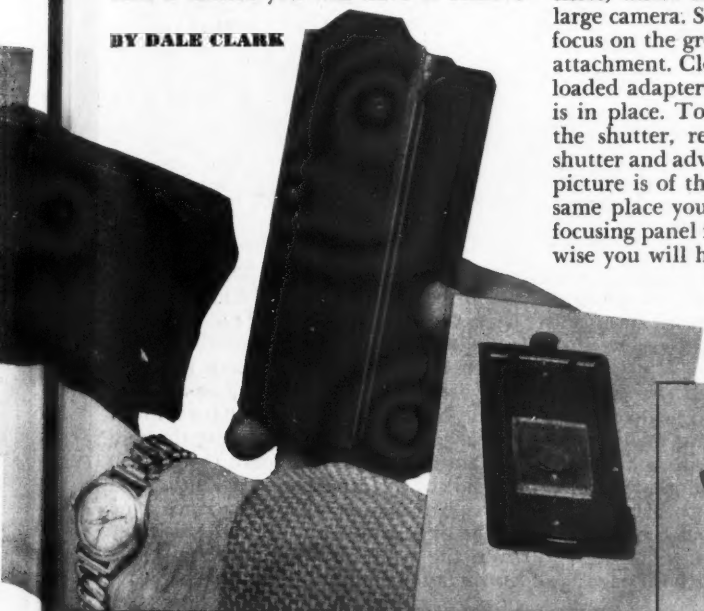
Camera body is bolted to a cut film holder. Slide is removed before making the exposure.

the film chamber. This is then bolted to a cut film holder into which the appropriate size hole has been cut to allow the light from the lens to reach the film. (Cut an opening 1x1½ in. for 35mm films and an opening 1⅛x1⅝ in. for Bantam film.) Some of these cameras have an arched film track, especially those which use a meniscus lens. This kind of track is required to correspond to the curved image that a meniscus lens makes. If you get such a camera you will have to remove this track and insert a flat track, for the lens of your large camera presents an absolutely flat image in the film plane.

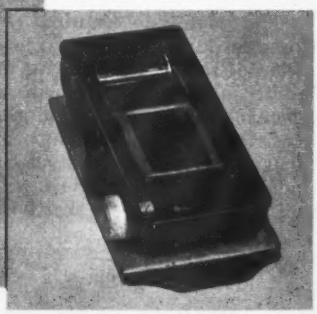
A ground glass focusing panel, as shown in the drawing, is also required for accurate focusing. Make sure that the ground glass is in the same plane as the film track. *This is very important.*

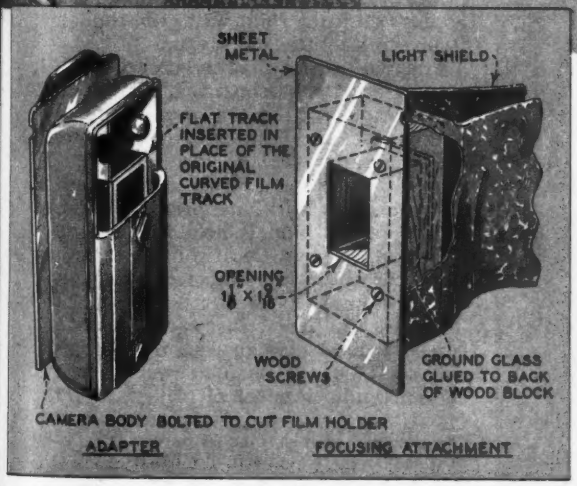
After the adapter has been loaded with the 35mm or Bantam Kodachrome, depending upon the type of camera you chose, insert the focusing panel in your large camera. Set the shutter on time and focus on the ground glass of the focusing attachment. Close the lens and insert the loaded adapter. Make sure that the slide is in place. To make the exposure, cock the shutter, remove the slide, trip the shutter and advance the film. If your next picture is of the same subject and at the same place you will not have to use the focusing panel for the second shot. Otherwise you will have to repeat the step.

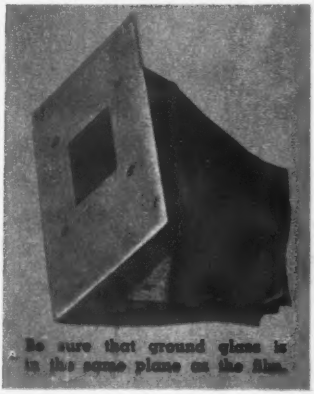
BY DALE CLARK



An opening is cut in body of film holder and the focusing panel to correspond to the size of Bantam picture frames.







Be sure that ground glass is in the same plane as the film.

Electric Print Drier

Impatient nail-biting while waiting for your prints to dry can be eliminated if you build this handy device.

BY IRA BILOWIT

THE most enjoyable chore in making pictures is waiting for them to dry. There is no work involved of course, but still and all we like to see what our handiwork looks like. Well, here's a simple method of eliminating that time-consuming wait. It's an electric print drier and all it uses, is a 60-watt bulb, as a source of heat.

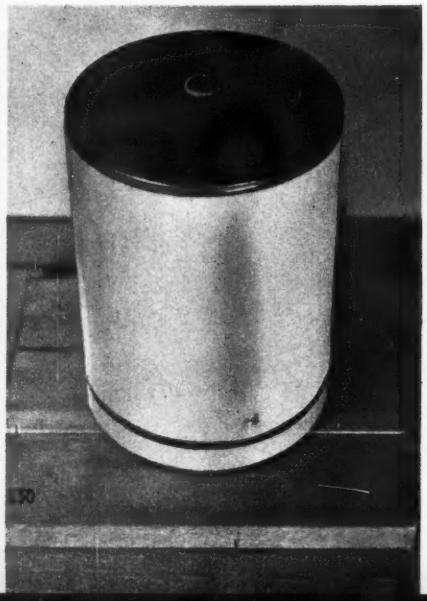
The materials required are usually found around the house. They consist of a large tin can about 6 in. in diameter and 8 in high, a cover with a knob, an electric socket and the aforementioned electric bulb. Oh yes, we nearly forgot, a strip of canvas as wide as the can and long enough to encircle it.

If you'll look at the sketch on page 151 you'll see exactly how the Electric Print Drier is put together. The porcelain socket is screwed down to a baseboard which measures about 8½x10 in. Lead the wire out by drilling a hole in the edge of the board. This will make for a much neater job than passing the wire through the bottom of the baseboard or through the side of the can. If you pass it through the side of the can you will sacrifice some of the drying area and if you lead it out from the bottom of the baseboard, the entire assembly will rock on the wire, possibly causing a short after long use. So, let's do it the right way, even though it involves a little more work.

You will notice that the socket holds the cover to the baseboard. The knob on the "bottom" of the can permits you to remove the can. The knob is not absolutely necessary as the can can be removed by grasping it firmly in two hands and rocking it with an upward motion.

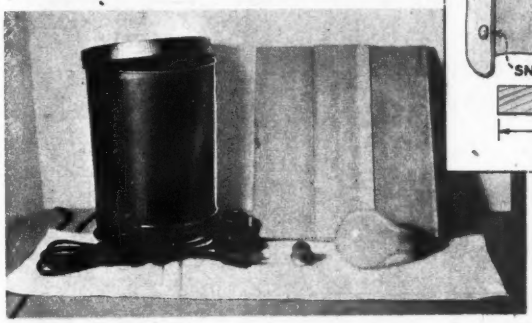
The canvas strip is held in place by two snap fasteners. Or, if you prefer, you can secure it with a rubber band at top and bottom.

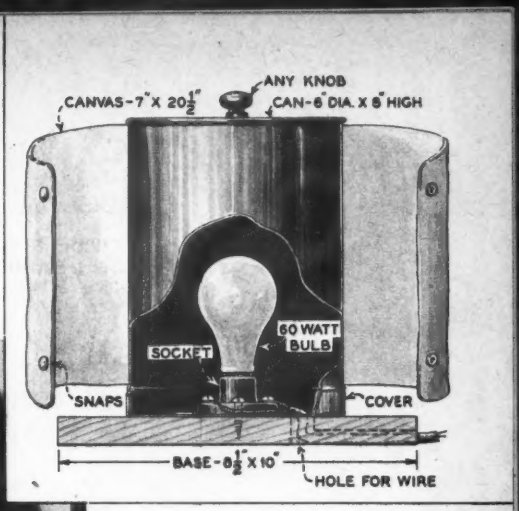
To use the drier, the wet prints are placed around the can with the picture side out. Arrange them so you can put the maximum number of prints around



The completed drier showing the canvas strip held in place with a rubber band. A 60-watt bulb supplies all the heat.

the can. They will remain in position until the canvas cover is wrapped around them. Switch the bulb on for about 2 or 3 minutes, remove the cover, and lo and behold, you'll find your prints as dry as any professional drier can make them and all at a total cost of, well, it cost me 10c for the bulb and 15c for the socket. Can you do better?





All of the parts needed to make the drier; it has a total drying area of 133 sq. in. and is only 8 in. high.

NUMBERS ON YOUR HOLDERS

THERE are many different ways to number your film holders so as to be able to tell which film holder took a particular picture. This method, however, is one of the simplest we've seen in a long time. Furthermore, the actual numbers can be shifted to other film holders as the occasion arises.

First of all, you'll need a clear piece of film. You can obtain this by soaking an old piece of cut film in hot water so as to remove the emulsion. Cut this piece of film triangularly, so that it can fit into one of the bottom corners of your cut film holder as shown in the enlarged inset view at the right. The number is drawn on this piece of film with an ordinary lettering pen and black india ink.

This bit of numbered transparent film fits right over the cut film in the holder. Don't worry, it won't fall out, the cut film is thick enough to keep it in place. In fact it may be rather snug, in which case you will have to bend up the film channel slightly.

Thus, every time you take a picture the light will first have to pass through the numbered piece of film before affecting the cut film directly below it. When you develop your film you will find that the black india ink held back the light. The number will be visible as a transparent digit in one of the corners of film. It will print black in the finished print, unless you crop the negative.

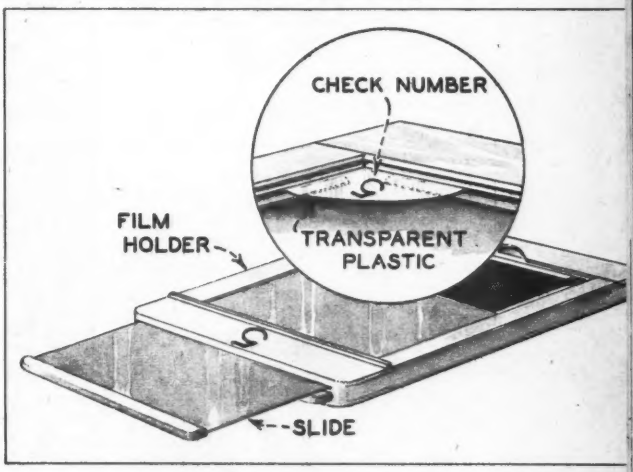
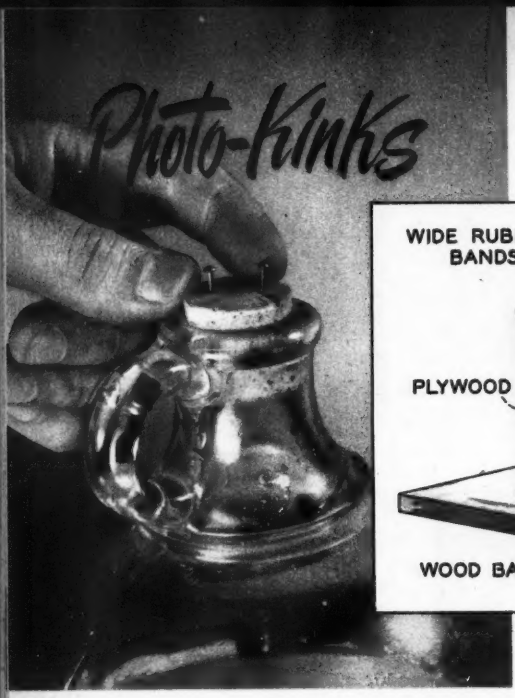
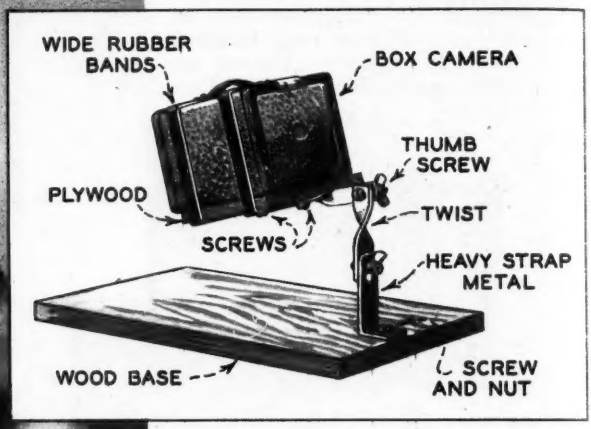


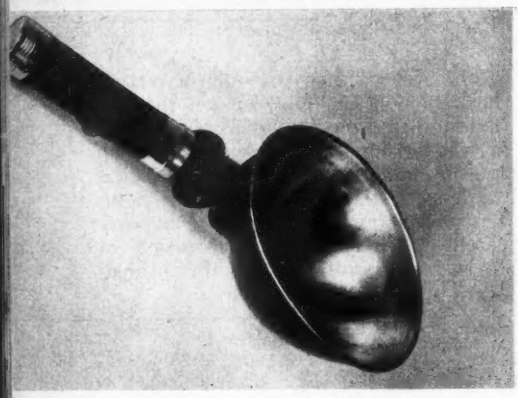
Photo-Kinks



Identify photo solutions in the dark by sticking brads into the corks. Bottles using screw caps can have shallow grooves filed on top of the caps.



A time exposure with a box camera is a simple matter with this device; it holds the camera steady and permits it to be tilted in all directions.



An outlet cube screwed into a hand flash gun will triple its capacity. Outer rim of the cube is factory-threaded to accept the photoflash reflector.

THE QUESTION BOX

by Robert Brightman

Photo fans! Use this column for answers to any of your problems on photography. If the question involves a print fault please include the print with your letter (and postage for its return).

What side of contact paper is the emulsion side? Ellis Pointer, McKinley Rte., Ore.

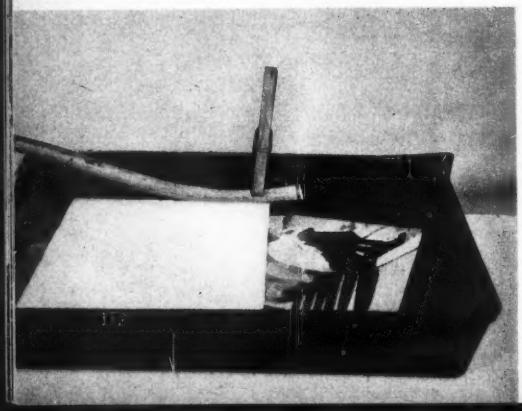
The emulsion side of the paper has a slight gloss to it as distinguished from the dull side of the back. Another way to determine the emulsion is to put the paper down on a flat surface. The emulsion side will have a slight inward curl.

Would you please tell me where I can get plans for making a photo printer? Donald Joklin, Green Bay, Wis.

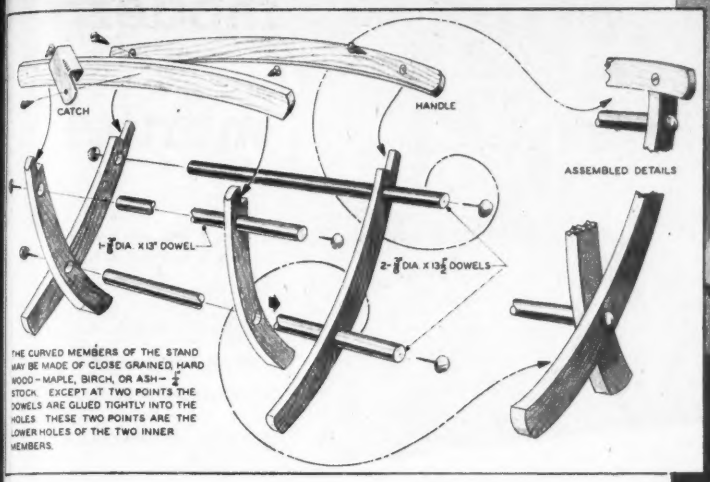
Plans for building a contact printer appeared in the Feb. 1943 issue of MI. You can procure a copy by writing to our home office at Greenwich, Conn.

Can you tell me what caused the streaks in the enclosed negative? Walter Wolford, Maywood, Cal.

The streaks in your negative may be due to several factors. One of them is insufficient fixing and hardening. I notice that some of the anti-halation backing is still evident in the lower left hand corner of the negative, as you hold it with the emulsion toward you. Streaks may also be caused by dirty film clips. Another possibility may be due to uneven immersion of the film in the developer. Lack of agitation, part of the film floating out of the developer or uneven stopping of the developing process will also cause streaks.



Clamp the water hose to the side of the print-washing tray with a clothes pin. Swirling action hastens washing and prevents possible print damage due to a too forceful stream of water.

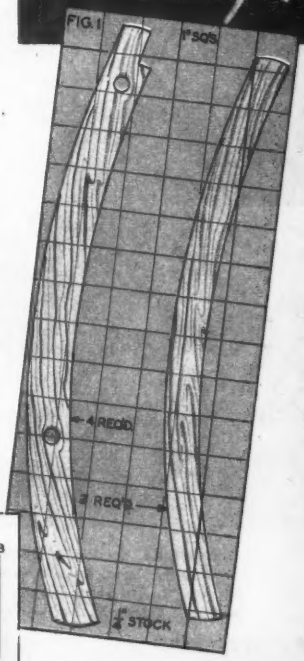


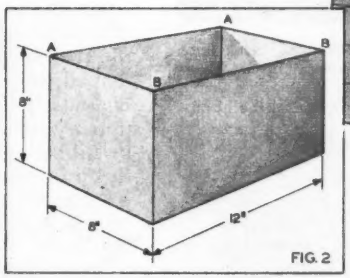
folding knitting stand

Pick it up—set it down—it opens automatically.

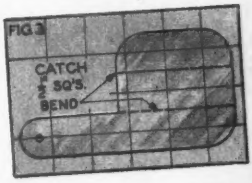
YOUR wife will get just as much pleasure out of using this knitting bag as you will get out of making it. It is portable, it can be carried from room to room, and your wife can set it down wherever she chooses to work. It is sufficiently roomy to hold that large slipover sweater which the distaff side promised to knit you some day.

The stand is made of six curved pieces of ¼ in. plywood and three ⅜ in. dowels. They should be carefully rubbed and waxed so that the cloth bag will not snag. The bag can be made of any suitable material. It really is a rectangular "box" of cloth whose dimensions are given below. The two top dowels pass through "tunnels" sewn into the upper edges of the bag. Upper dowels should be glued in place; leave the lower one free for this one acts as a hinge. Complete the stand by making a catch out of sheet brass as shown above.





Use chintz or cretonne to cover the frame; see Fig. 2 for the dimensions.



modern mantel clock

A motor-driven time-teller sans usual numbers.

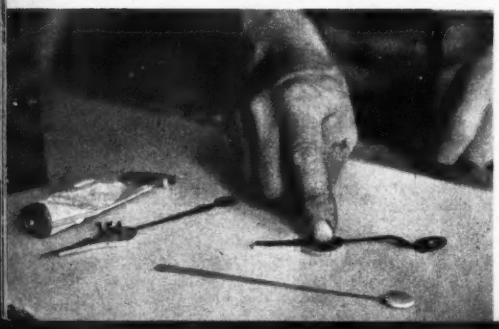
BY D. C. MARSHALL

A CLOCK without numbers may seem like an impractical idea but, after all, everyone knows what time it is by the position of the hands.

Now that many things are coming back on the market, electric clock-works will be among them. There is a lot of fun in making this electric clock—it doesn't cost much, it doesn't take long to make,—and it has no numbers!

The most exacting part is getting the twelve segments of the face cut to the proper angle. These triangular-shaped pieces are glued up with the spacing bars. Glue them together by passing a strap around the outside and clamping the ends up tight by means of hand screw clamps and blocks nailed to the strap.

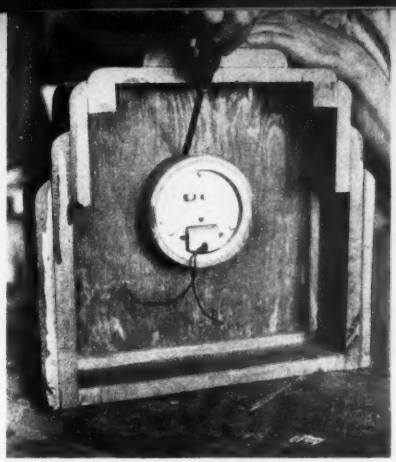
Cutting the outside edge of the clock face on a band saw. Below: Cementing the wood facings to the clock hands with quick-setting cement. Note offset band in one of the hands.



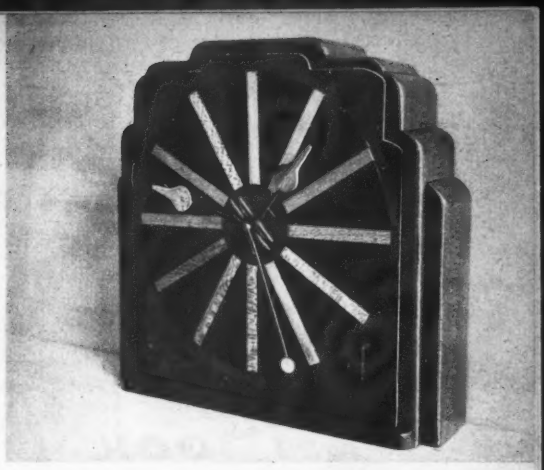
After the face has been glued, the center is cut out on the jig saw and trued up to make a circular opening for the lathed-turned center block. The circumference is marked out and cut on the band saw then smoothed up on a disc sander. The panel for the front is made of 1/8 in. walnut-faced plywood.

The case is made of cherry which gives a pleasing contrast with the walnut front. The various pieces are ripped to width on the circular saw and the curved ends are shaped up on the band saw and sander. Round off all outside front corners. The upper part of the panel is held in place by rabbeting the top blocks indicated in the drawing. The face is glued to the front panel and then the panel is shaped on the band saw to fit into the opening.

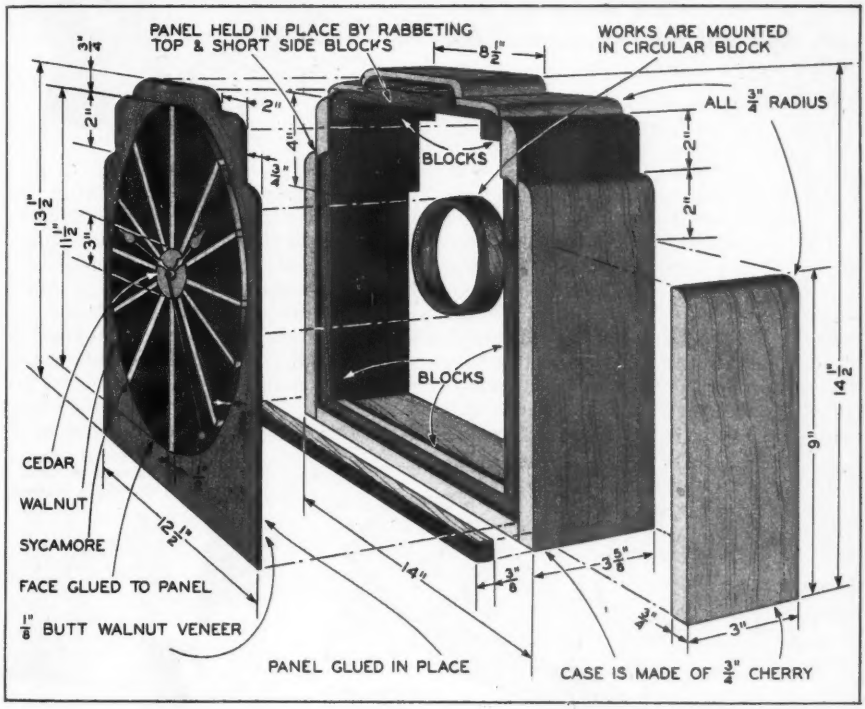
The clock works are mounted in a wood block. This block is turned on the lathe to make a snug fit around the



The back of the case showing panel in position and works mounted in the circular block.



The light-colored wood inlays separate the larger pieces and also serve to represent numbers.

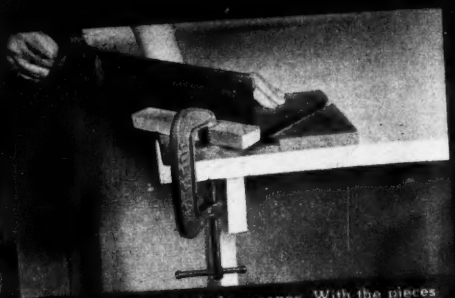


works which is then secured to the back of the panel.

Since the case is made of different kinds of woods, the finish should be a clear varnish or lacquer. Two coats will be sufficient; the last coat should be rubbed down with oil and pumice for a matte finish.

The wood blocks for the hands may be made of cedar facings with a button of maple for the sweep second hand. The hands may have to be bent so they will not interfere when passing each other. When all finishing has been completed, the works are put in place and fastened with a retaining ring. An extension cord is wired to the two leads and the clock is ready for use.

Use a pattern of light colored cardboard to cut the ends. This is easier than following pencil marks.



The easy way to cut dado grooves. With the pieces clamped to the table, a small block guides the saw.

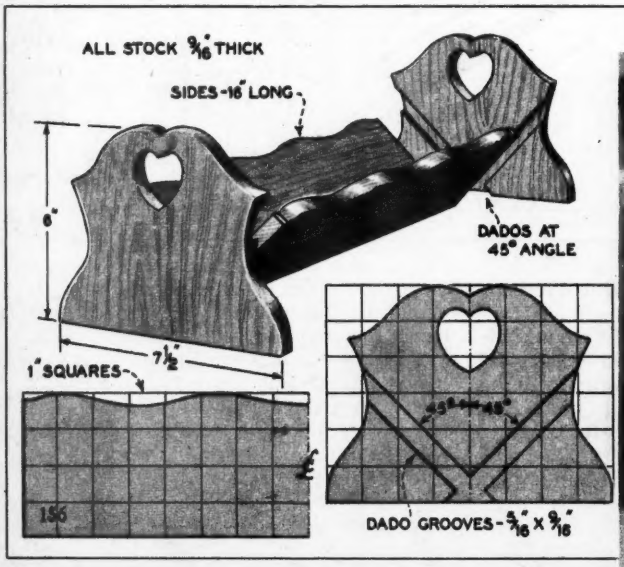
Book Trough

No more scratched tables or sliding book ends with this convenient holder.

GRACEFUL in design and simple in construction, this trough is ideal for keeping your favorite books no further away than your fingertips. An added advantage is that you can read the titles at a glance because of the angle at which the books are held.

The trough consists of only four pieces, two sides and two ends, which for the best appearance should be made of a hardwood such as walnut or mahogany. You can start the work by cutting two 6 by 8 in. pieces for the ends. After transferring the pattern to these from the drawing, cut the dado grooves and jig out the openings. This is easier to do before the pieces have been cut to shape. After this has been done, cut out the two sides by following the drawing for size and shape.

When all the pieces have been given a thorough sanding they should be glued together and allowed to dry in clamps. To finish the trough, give it several coats of shellac, well diluted with alcohol, and rub it down lightly with steel wool between coats. A final coat of wax will help preserve the finish. —*Bertram Brownold.*



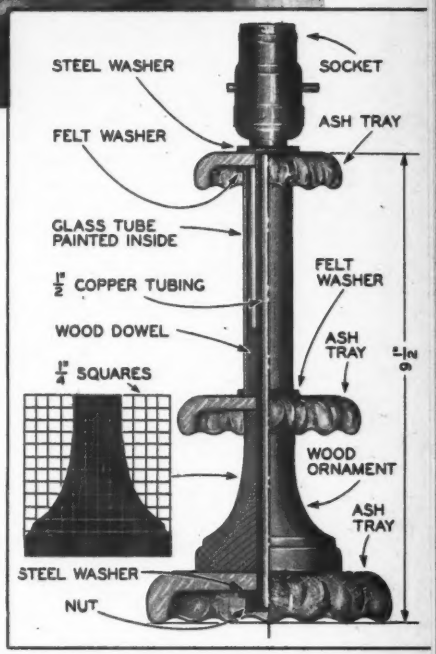
The sides should be a driving fit in the dado grooves.

crystal boudoir lamp

Dime store parts plus a few hours work will produce this novel accessory.

MILADY'S dressing will be a brighter part of her day with a pair of these modern lamps. With the exception of the turned lower spacers, all of the parts can be bought at the local five and ten. The crystal pieces are nested glass ashtrays while the upper stem is a piece of glass tube painted on the inside. The other parts are regular electrical items.

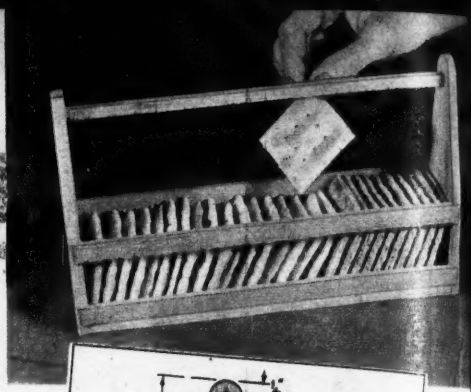
Drilling the holes in the center of the ashtrays is the hardest job so tackle it first. Use a ½ in. copper tube as the drill and build a putty dam filled with turpentine around the hole on the bottom side of the glass. Carborundum grain is used as the cutting agent with a wood block for backing. Pull your drill up frequently, take it easy and there shouldn't be any difficulty. Cutting the glass tubes isn't hard either, file a groove around them with a three-cornered file and break the tube off even. Assemble the parts as shown in the drawing, wire the lamps and—lights on.
D. C. Marshall

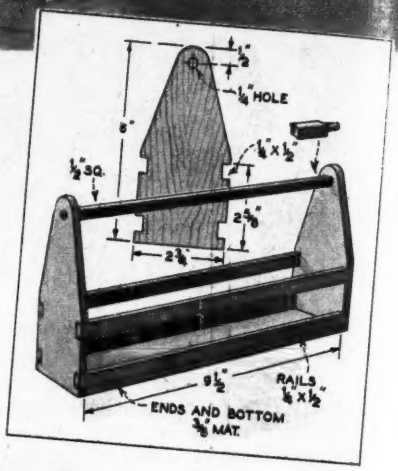


Below left: Assembling the parts on center tube. Drilled trays on table. Below right: Using copper tube and abrasive to drill a hole in the glass.

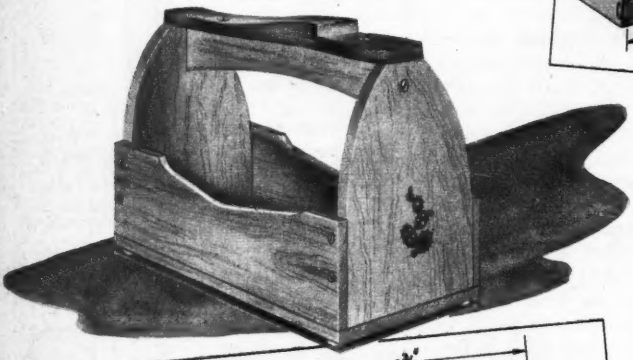
ONE NIGHT SPECIALS

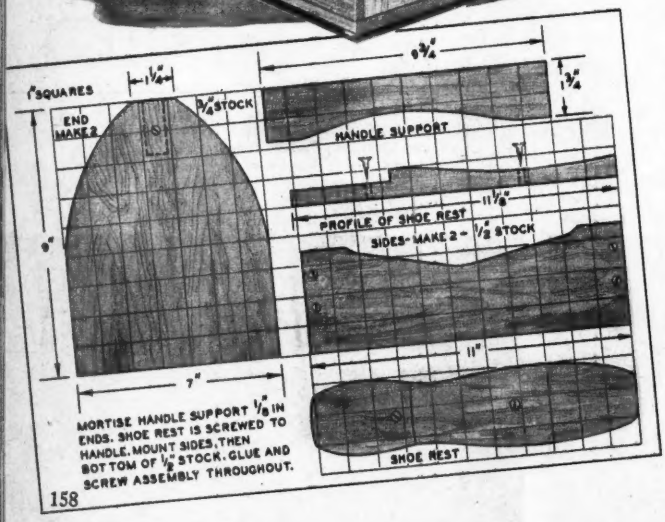
Time on your hands? Then make one of these useful projects in an evening.





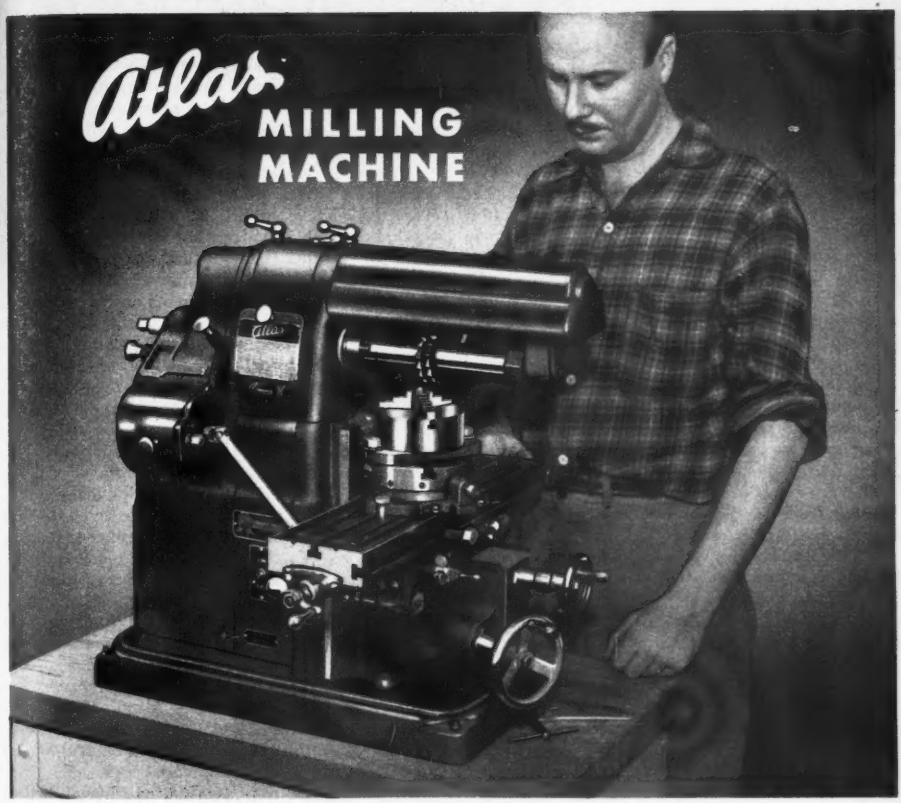
SERVING crackers can be more pleasant and gracious with this handy little tray that makes an ideal "bread-and-butter" gift any hostess will appreciate. The construction is simplicity itself with the ends and bottom of plywood or hardwood and the rails and handle made of the same material. Follow the details in the drawing for sizes and when all the parts are cut to shape, glue and nail them together. Finish the tray by staining and varnishing.—Roland Cueva





IF the "little woman" complains about your shining shoes on her kitchen chairs, then turn out one of these kits and put your feet where they belong—on the shoe rest.

For the best appearance, use a nice hardwood, oak or mahogany are tops, as the stock. Transfer the patterns for the parts and cut them to shape. The ends are then mortised about 1/8 in. for the handle. Before assembling the parts, round off the edges and sand the pieces smooth. Glue and screw them together, using oval-head wood screws. The best finish is a stain or natural one, followed by varnishing. — Claude E. Sorensen



THE HOBBY THAT PAYS FOR ITSELF

MOST PRACTICAL of all winter hobbies is a well-equipped home work shop.

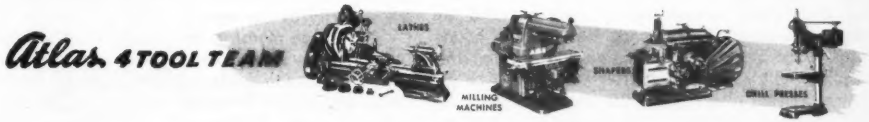
It's a quick, sure way for business and professional men to get away from daily cares, relaxing to the restful hum of busy tools. Most valuable, too, in repairing home equipment and making useful articles for home or business.

For inventive men — with commercial ventures in mind — an Atlas-equipped shop helps you make working models of your ideas, and go into production on them when they prove practical.

The ideal precision tool for all types of milling operations is the Atlas miller. Its table travels 10" horizontally, 3½" cross, 6" vertically. Spindle speeds from 62 to 2870 RPM. Back-geared power, V-belt drive, Timken bearings. Operates from ⅓ HP motor. See one at your Atlas distributors.

"SUCCESS STORIES"—FREE

Reports of personal progress and success of men from coast to coast who have built profitable businesses starting with one or two Atlas tools. Sent free with latest Atlas catalog. Write Atlas Press Co., 252 North Pitcher St., Kalamazoo 13D, Mich.



Tree Conservation

[*Continued from page* 137]

shallow root systems are most apt to become involved in such treacherous anchorage conditions.

Another soil condition that provides poor root anchorage for large trees yet deceptively stimulates the growth of saplings, consists of a thin layer of earth covering an underlying rock ledge. Here the root system may be only several inches deep, but if the spot is shaded from the hot sun, it will receive sufficient moisture from the ledge to sustain the growth of the tree for quite a number of years. Lacking sound anchorage, however, the tree might easily be blown over by a wind storm, in which case the roots simply pull the thin soil layer up with them, photo D.

The anchorage of trees is weakened if the prevailing water table is raised. This should be taken into consideration before excavating or damming up a nearby brook to make a pond, Fig. 4. A tree forced to grow under such conditions should be guyed. Willows and other trees that thrive in wet ground are not likely to be affected.

Fallen trees should be cut up and burned as soon as possible. If left around they breed parasites that attack healthy trees. Roots and stumps that have not been uprooted should be cut off below ground level and covered with a layer of soil to promote rotting and thus discourage the sprouting of shoots.

Treating Injuries and Wounds. Trees should have sound trunks and branches to support and sustain a healthy foliage in order to digest their food. The leaves do this in the presence of sunlight by a process called photosynthesis. Means by which food is conveyed to leaves for digestion and then distributed to growing cells for the formation of wood and bark is illustrated in Fig. 5.

The problem of treating most tree injuries is a simple one that calls for pruning the injured member in a manner that leaves the wound in a favorable condition for rapid healing. Until a wound is entirely healed it serves as a possible entrance for insects and decay-causing organisms.

Photograph E shows the method by which trees cover their wounds with a protective layer of bark and wood called a *callus* and illustrates why clean cuts heal faster than jagged cuts. Of the two pruning cuts shown in the process of healing, the jagged cut at the top is obviously healing under difficulty, due to the irregularity of the wound area. This condition naturally slows down healing and thus encourages decay.

Tree experts usually recommend the application of a coating over tree wounds to serve as a protective dressing. Shellac or creosote make good sterilizing undercoats, while spar varnish, asphaltum and house paints can be used as weather-resistant finish coats. Varnish and house paints may be colored to match the bark of the tree. (Don't use creosote or tar dressings on cherry, peach, plum, magnolia or tulip trees.)

In applying dressing, overlap the surrounding bark only enough to seal the joint, as the presence of dressing on the bark tends to retard the healing callus. Care should be taken not to spill dressing on healthy bark. Large areas deprived of the ability to breathe by the sealing effect of the spilled dressing are likely to die.

Dressed wounds should be inspected regularly and given additional treatment when necessary. Weather checks or cracks, which develop with age, should be sterilized and sealed. Cracks too wide to be filled by painting can be filled with sawdust soaked with creosote.

Cavities resulting from mechanical injury or rot should be cleaned out back to sound wood and sterilized. It is usually best to keep small cavities open while they are healing. This permits ready inspection and avoids the danger of the new growth healing over a hidden decayed area. In cleaning out large cavities, shape the excavation so that no hollow exists where rain water can accumulate and remain to cause rot.

In some cases it is advisable to fill a large cavity, especially if it is located where it cannot be drained without cutting away an excess amount of sound growth. A common example is a cavity located at top of a limb growing horizontally.

Asphalt fillings, made by mixing melted asphalt with sawdust, can be used in cavities that are subjected to movement. Where no movement is likely, concrete fillings may be used. Large concrete fillings should be cast in sections with tar paper separators as expansion joints. Cloth, canvas, and sheet metal covers are commonly employed to retain fillings in cavities on trunks and limbs that run vertically.

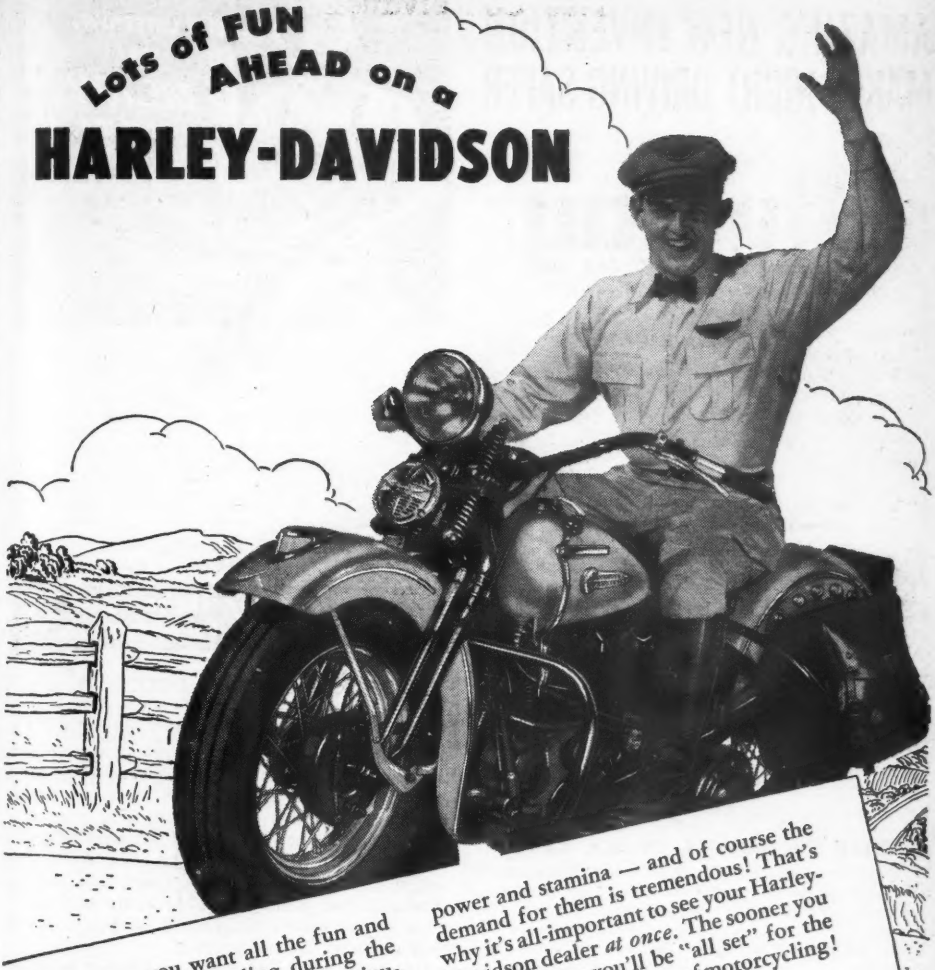
Strips of wood may be used as filler if soaked with creosote to prevent rotting. All joints between the strips, however, must be made watertight with asphalt. Assemble wood fillings with nails or screws. Parts of a split cavity should be bolted together before the filling, Fig. 8.

Always use sharp tools for shaping cavities to insure clean cuts and to avoid unnecessary bruising of the delicate cambium layer. Apply shellac or creosote within a few minutes after making the finish cut to prevent infection.

In many cases, large cavities are better off if left unfilled, since fillings seldom add strength and may become an infection hazard if allowed to deteriorate. Hollow wounds are usually treated by sterilizing them with shellac or creosote and then coating them with a heavy layer of asphalt. The practice of charring large hollow wounds with a blow torch is also effective for heat is an excellent sterilizer. The torch should be applied carefully so that the cambium will not be killed back unnecessarily by the heat.

Major tree pruning and cavity work should be undertaken after the sap-flowing and active growing season is over (late summer or early fall) and before freezing weather makes it difficult to handle fillings and dressings of concrete, asphalt and paint.

Lots of FUN AHEAD on a HARLEY-DAVIDSON



Sure thing — you want all the fun and excitement of motorcycling during the months to come! Life will be a continuous round of pleasure — when you own a Harley-Davidson. The new 1947 models have thrilling beauty, speed, power and stamina — and of course the demand for them is tremendous! That's why it's all-important to see your Harley-Davidson dealer *at once*. The sooner you do, the earlier you'll be "all set" for the thrill-packed good times of motorcycling!

HARLEY-DAVIDSON
Motorcycles

HARLEY-DAVIDSON MOTOR COMPANY, Dept. MI, Milwaukee 1, Wisconsin

Please send at once free copy of 24-page "Enthusiast" Magazine, filled with motorcycle action pictures and thrilling stories.

Name.....

Address.....State.....

City.....

AMAZING NEW INVENTION MAKES NIGHT DRIVING SAFER

Blu-Ray
CUTS HEADLIGHT GLARE

BLU-RAY makes night driving a glarefree pleasure!

A blessing to night drivers! BLU-RAY operates upon an entirely **new and effective** anti-glare principle. Directs a downward "V" of restful **blueness** upon your windshield that acts to cut the dangerous glare of on-coming cars. Guards your vision like nothing else has ever done before! Absolutely **no loss of visibility!**

EASY TO INSTALL IN ALL CARS

BLU-RAY goes on with your lights! In minutes, you'll see what an amazing difference BLU-RAY makes in better vision and safer, more enjoyable driving. Be among the first to equip your car with this revolutionary new invention. Now—mail coupon below with check or money order. BLU-RAY is guaranteed for 30 days against damage or mechanical defect.

Patent Pending

ONLY **$4.75** postpaid
No C.O.D.'s, please.

BLU-RAY—compact, sturdy, finished in gleaming aluminum. Comes equipped with 4-ft. cord and two 6-volt bulbs—ready to be installed in your car!

CLIP COUPON NOW! 30-DAY GUARANTEE

M & M Distributing Co.
3659 N. Avers Avenue
Dept. MI, Chicago 18, Illinois

Send me BLU-RAY on your 30-day guarantee. I enclose $4.75, check or money order. Rush BLU-RAY postpaid.

Name _____

Address _____

City _____ Zone _____ State _____

"In your opinion, which make of handsaw is highest in quality?" Thousands of carpenters were asked that question. Three out of four replied, "Disston saws" . . . a high tribute indeed, for it comes from men who know saws best.

The reasons for this preference may be summed up in what one carpenter says, "You can't beat a Disston for good, clean cutting and long life."

Ask your Hardware Retailer for a fine looking, fine performing Disston Saw. Also ask him for a FREE copy of "The Disston Saw, Tool and File Manual," or write to us direct.

HENRY DISSTON & SONS, INC.
208 Tacony, Philadelphia 35, Pa., U. S. A.

DISSTON The saw most Carpenters use

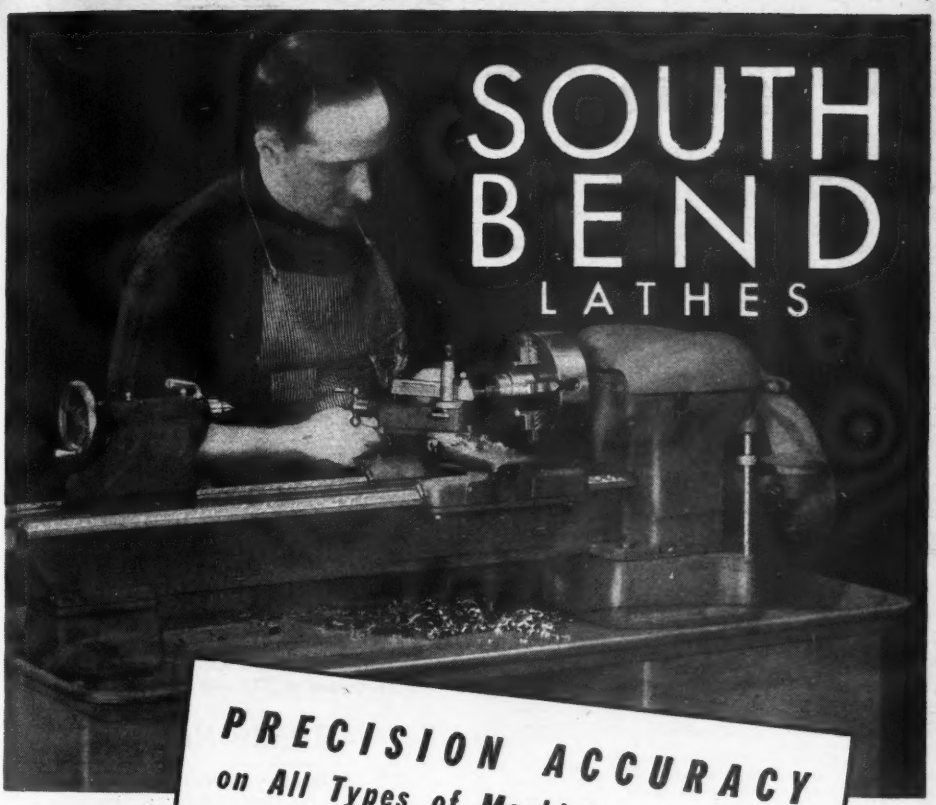
Modern Home From Mud

[*Continued from page* 118]

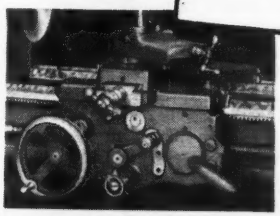
cracking; too much sand decreases strength and resistance to erosion. Place the mold on level ground and force the mud into the corners with the hands. Remove excess mud with a straight edge across the top and lift off the form immediately. In about two days turn on edge. After drying in the sun two weeks or more, examine for cracking and strength. This text determines whether additional blending is advisable. Small center cracks are not harmful.

Using the soil mixture that has shown satisfactory strength and the least cracking in the previous series, make up a new batch and divide into four parts, each enough for a standard size brick, 4x12x18 in. To No. 1 add two pounds or one quart of stabilizer; two and one-half pounds to No. 2; three pounds to No. 3 and three and one-half pounds to No. 4. Thus each brick will contain approximately 4, 5, 6, and 7% of stabilizer respectively by weight of the 50-pound brick. Mix each portion thoroughly and mold in the brick form, saving enough from each for a pat about ½x4 in. in diameter. Allow the bricks to dry in the sun, but hasten the drying of the pats by placing in a slow oven (150-200° F.). When the pats are cool, immerse in cold water for 24 hours.

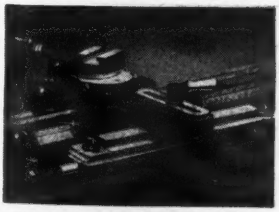
The March issue of MI will conclude this interesting article by Mr. Sibley with a description of how his adobe brick home was completed.



PRECISION ACCURACY
on All Types of Machining Operations



ACCURATE OPERATION is assured through large, graduated collars on cross-feed and compound rest screws, and through convenient apron controls.



TAPER ATTACHMENT for 9-inch lathes, designed and built for accurate taper turning and boring. Features degree and taper-per-foot graduations.

South Bend Lathes bring to all machining operations the precision which makes fine craftsmanship possible. The ability to do fine work is further aided by the ease with which these lathes can be operated. Easy-to-read, accurately graduated micrometer adjustments, and smooth, positive action of easy-to-reach controls encourage operators to put forth their best efforts. These worthwhile features are important not only in large industrial toolrooms and manufacturing plants, but in the smallest shop. Investigate the many advantages which versatile South Bend Precision Lathes can give you.

FREE CATALOG—Write for it! It illustrates and describes all types, sizes, and models of South Bend Lathes. Specify size in which interested—9", 10", 13", 14-1/2", or 16" swing.

LATHE BUILDERS SINCE 1906

SOUTH BEND LATHE WORKS

453 E. MADISON STREET • SOUTH BEND 22, INDIANA

Saves Hundreds of Dollars!
You need only this Hobart Generator, a used auto engine and chassis to build your own Hobart gasoline drive portable arc welder — saving from $150 to $300! Send coupon for free book telling you how, no obligation.

Profitable Business!
An Arc Welding Job Shop is one of the most profitable businesses today, especially when one considers the minimum investment required. People bring auto and farm equipment for repair; construction jobs are countless — all bring you big profits!

Easy Operation!
Only Hobart can offer you the time and money saving advantages that guarantee *extra* profit! You get 1000 combinations of welding heat — the right heat for every job.

The Hobart Welding School!
A non-profit institution teaching every phase of welding. Modern building, expert instructors. Veterans —enroll under G. I. Bill. Check coupon for free book.

HOBART BROTHERS COMPANY
Box SM-27, Troy, Ohio

Gasoline Drive Arc Welder

Electric Drive Arc Welder

A. C. Arc Welder

"One of the World's Largest Builders of **arc welders**"

HOBART BROTHERS COMPANY, Box SM-27, TROY, OHIO

Free! Send me this "Welders' Guide," full of handy standard welding information.

Also send details on:
- ☐ "Build Your Own"
- ☐ Electric Drive
- ☐ Gasoline Drive
- ☐ A. C. Arc Welder
- ☐ Welding School

NAME_____

ADDRESS_____

TORNADO
BURNER
A Flame for Every Laboratory Need

The Tornado Burner No. 140 is equipped with three interchangeable brass tips giving three sizes of flame (approx. ⅛", ¼" and ⅜" blast.) The easy interchange of these tips enables the burner to perform virtually any laboratory job where a narrow or wide, hot or soft, flame is needed.

No air adjustment is necessary; the burner is self-adjusting. The brass needle valve regulator, conveniently located on the side of the burner, regulates the flow of gas and is a gas shutoff, eliminating the necessity of turning off the gas at the supply source.

The steel base, constructed with two side holes, makes it simple to attach to a work bench or table.

Due to a patented feature, the Tornado Burner will, without the necessity of using grids, create a flame in which the heat is evenly distributed, thereby giving a faster and better heat.

TORNADO
GAS TORCH
The Modern Way of Soldering

Ideal for hard and soft soldering. Will heat quickly; solder will flow freely and smoothly. No compressed air required. Nothing to Pump. Self-adjusting. Safe. Economical. Can be used for annealing small parts and bending metal parts. Generates a heat of 1700° Fahrenheit. Simply connect to any illuminating gas jet with a rubber hose and operate. Tornado Torch No. 119 comes with three (3) tips (⅛", ¼", ⅜" blast).

The Tornado Gas Torch No. 119, or the Tornado Burner, complete with three tips, is $2.95. A combination of the Tornado Gas Torch and Burner, with three interchangeable tips, is $4.50. See your dealer or order direct. Send check or money order—post paid.

Robco Corporation, 208 E. 44th Street, New York 17, N.Y.

Handy Hamper

[*Continued from page* 123]

consist of half-inch dowels. See Fig. 2 for the bracket detail.

The push-front mechanism consists of a curved arm pivoted to a plate by means of a rivet. The plate is screwed to the inside of the top section, so that the little roller at the end of the arm impinges on the inside of the push-front. The arm is linked to the spring by means of a waxed cord passing through a small pulley which is screwed to the inside of the top section.

The finish and decoration are largely a matter of taste and will depend on color scheme used.

Mister Mulligan

[*Continued from page* 129]

the wing with $\frac{1}{16}$ in. sheet is recommended if you're using a class C engine; otherwise, Silkspan will suffice.

Next, carve the rudder from the indicated stock and cement to the fuselage. Cement the windshield in place and spray the model white.

Balance the model at a point one third back from the leading edge. After noting the ease with which the model handles, during take-offs, landings and in flight, you'll better understand why the prototype job gained National Air Races fame yet to be equalled by any Racer!

Don't envy the fellow who plays an instrument . . . You, too, can be popular and have fun *making music!* You can entertain others . . . be the "life of the party." Playing a wind instrument is *easy* . . . and *it's a lot more fun than just listening!* Anyone who can whistle a tune can play a new Conn. The fingering is simple and the scale comes easily because of exclusive, patented Conn features and advanced design. *Get all the thrilling details.* See for yourself how *you* can have fun and win popularity through music. See your friendly Conn dealer, or write direct to Conn for FREE copies of the profusely illustrated, interesting books shown at right. Do it today!

CONN BAND INSTRUMENT DIVISION 1914

Write . . .
FOR FREE BOOKS

TEEN-AGERS—Ask for "Fun and Popularity Through Music." Ideas and examples of how *you* can enjoy advantages and opportunities which playing a wind instrument provides.

PARENTS—Ask for "Music, The Emotional Outlet for Youth." An important guide in rearing children that is widely acclaimed by authorities on youth problems.

CONN BAND INSTRUMENT DIVISION
C. G. Conn Ltd.,
289 Conn Building, Elkhart, Indiana
Without obligation, please send FREE Book checked below.

☐ *"Fun and Popularity Through Music"*
☐ *"Music, The Emotional Outlet for Youth"*

NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE____

CONN BAND INSTRUMENTS

WORLD'S LARGEST MANUFACTURERS OF BAND INSTRUMENTS

The HUDSON TURBO GRINDER

The Amazing New Convenience for Home and Shop

Sharpens Everything Fast

Most useful accessory ever offered for the handy man, housewife, hobbyist, shop and auto mechanic, farmer...everyone who uses knives and tools. Fits any ordinary faucet. Just turn on the water and the patented Hudson jet-impeller drives the grinding wheel at speeds over 3,000 RPM. Adjustable to 10,000 RPM, depending on water pressure. Precision built, quality throughout. Super-hard silicon carbide wheel, stainless steel shaft, Chrysler Oilite Bearings. All metal parts gleaming chrome. Colorful vinylite tubing.

Sharpens knives, scissors, lawn mowers, skates, wood planes, chisels, bits, axes, hatchets and all edged tools.

FULL MONEY BACK GUARANTEE
See Your Hardware Dealer

IF YOUR DEALER DOESN'T HAVE THE HUDSON TURBO GRINDER YET—SEND COUPON TODAY

HUDSON PRODUCTS CO.
4441 ST. AUBIN AVENUE
DETROIT 7, MICHIGAN

HUDSON PRODUCTS CO.
4441 St. Aubin Ave., Detroit 7, Michigan

Enclosed is a $8.95 ( ) check, ( ) money order for which rush to me, postpaid, one Hudson Turbo Grinder with full instructions for use. I understand the Grinder carries a full, money back guarantee.

Name .....

Address .....

City ..... State .....

Name of Hardware Dealer .....

Address .....

A TREASURE CHEST FOR MECHANICS GARAGEMEN—FARMERS—EXPERIMENTERS

100 POUND HANDY ASSORTMENT SCREWS—NUTS—BOLTS WASHERS—RIVETS—SPRINGS $8.95

Think of it—this popular assortment specially priced at less than 9¢ a pound! Chest filled with 100 pounds of clean, new fasteners, mostly ¼" and larger diameters—bound to come in handy in shops, garages, on farms, or wherever a large variety is needed. Chest, too, is valuable for many uses after original contents have been used. Shipping wt. 115 lbs. Price only $8.95. Enclose remittance and shipping charges when ordering.

HUDSON TRADING CORP.
FA1517 N. Wells St. Chicago 10, Ill.

"Modulamp"

[*Continued from page* 131]

The ⅛ in. Masonite panel, 11x8½ in., may now be clamped to the chassis in its proper position and the necessary holes drilled. Cut a 5 in. hole for the speaker. A baffle was made from a piece of insulating board 6¾x5¾x½ in. Fasten the speaker to the baffle and then mount it on the Masonite panel. The speaker cloth and the strips of ½ in. moulding are purely for decoration.

LIST OF PARTS

Capacitors

C1,	C3	.01	mfd. 400 volt, paper
C2,	C5	10	mfd. 25 volt, electrolytic
C4,		.005	mfd. 400 volt, paper
C6,		8	mfd. 450 volt, electrolytic
C7,		16	mfd. 450 volt, electrolytic

Resistors

R1		100,000	ohm	1 watt
R2		500,000	ohm	½ watt
R3,	R4	1000	ohm	1 watt
R7		400	ohm	2 watt
R8		25,000	ohm	25 or 50 watt with slider
R5		250,000	ohm	potentiometer with tone taper
R6		500,000	ohm	potentiometer with linear taper and line switch (S1)

Transformers

T1	Power Transformer (Utah Y675) 320-0-320 75 ma 5 volt-3a 6. 3v-3. 2a
T2	Output transformer (Stancor A2523) 8 watts single or push pull plates to 1-30 ohm voice coil
T3	Microphone transformer with single button mike to grid (Utah 8885)
CH	Filter choke (Utah 4665) 15 henry, 75 ma-200 ohm D. C. resistance

Tubes

1-6F6, 1-6J5, 1-5Y4G

Miscellaneous Items

1—3½ in. PM Speaker (Utah)
3—SPST toggle switches
1—SPDT toggle switches
1—chassis 8x10x2½ in.
1—pilot light with 6.3 volt bulb, Banana jacks, mike jack, Masonite for panel, cloth for grille, nuts, machine screws, etc.

ELECTRIC DREMEL POWER TOOLS

OWN A "POCKET SIZE" MACHINE SHOP

IMPROVED MOTO-TOOL

APPROXIMATELY 27,000 R.P.M. CUTS CLEANER; SAVES CUTTERS

Moto-Tool Kit No. 2 has 23 professional accessories and model 2-Moto-Tool in wood case. $23.50. (Items purchased separately would cost about $30.00; you save $6.50). Moto-Tool No. 2 with one emery point, $16.50.

"MAN... WHAT A POWERHOUSE!"
A Tool That Packs Years of Pleasure

Here's a tool to please a man's heart. A gleaming "powerhouse" that holds promise of endless creative hours. This "pocket-size machine shop" is a war veteran . . . used by all branches of the armed forces in far flung repair bases . . . and it helped set production records at General Electric, Westinghouse, Remington Arms, Ford and other plants. Hobby enthusiast or expert craftsman . . . first choice is Model 2 Moto-Tool kit, with its handsome, felt-lined, highly finished wood case . . . with rows of tools begging to be put to work. The usefulness of Moto-Tool for precision work is increased by two versatile attachments now available at slight additional cost (see below).

LOOK FOR THESE MOTO-TOOL FEATURES!

• Housing has "pencil-type" finger grip • Instant-action, wrenchless chuck • Oil-less, sealed, trouble-proof bearings • Patented automatic chuck lock pin • Oversize armature shaft, hardened, ground and polished • 110 volt, universal type motor • Easily replaced commutator brushes • Sliding snap type switch • Handy hanger hook • Cord protector • Sturdy, shockproof bakelite housing • Dust-filtered, air-cooling system • Weighs only 13 oz. . . . shaped to fit the hand • Dynamically balanced for vibrationless operation.

Free Both Hands With Moto-Tool Attachments

Moto-Tool Stand (left) made of heavy cast iron, holds Moto-Tool at any position or angle -----$4.50

Moto-Tool Shaping Table $2.50 (Shown with stand, right). Aids accuracy in routing and grinding.

MONEY BACK GUARANTEE

Buy Dremel Moto-Tool and Accessories from your dealer. If he does not handle them, order direct from the factory on a 10 day trial, money back guarantee.

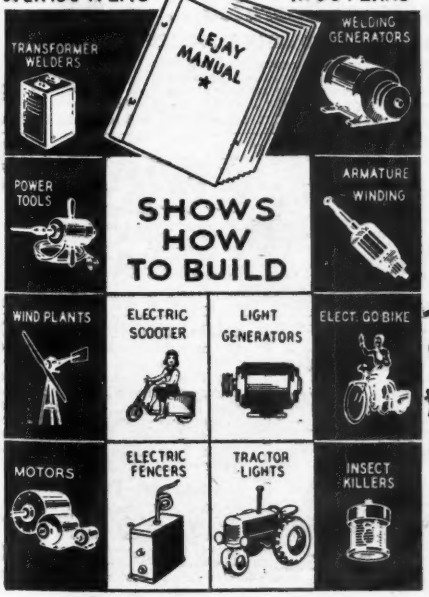
Do These Better—Faster

- ☐ Sharpening
- ☐ Burnishing
- ☐ Engraving
- ☐ Touching Up
- ☐ Mortising
- ☐ Polishing
- ☐ Finishing
- ☐ Cleaning
- ☐ Rasping
- ☐ Brushing
- ☐ Dressing
- ☐ Burring
- ☐ Grinding
- ☐ Routing
- ☐ Sanding
- ☐ Drilling
- ☐ Inlaying
- ☐ Sawing
- ☐ Scoring
- ☐ Cutting
- ☐ Carving

DREMEL MFG. CO., Dept. 147-B, RACINE, WISCONSIN

Here's FUN for Your Money—and PROFIT, too!

OVER 100 ITEMS IN 50 PLANS



PRACTICAL PLANS—EASY TO FOLLOW

You don't have to be a mechanical expert to enjoy working out these plans. They will enable you to build many worthwhile things that are saleable and to repair practically anything electrical. Among the many things covered by the LeJay Manual are:

- 200 Amp. Generator Welders
- Large Transformer Welders
- Gunsmith's Carbon Welder
- 6, 12, 32, 110-volt Motors
- Electric Outboard Motor
- Wind-driven Light Plant
- Electric Fenceers
- Electric Drills
- Bench Grinders
- Electric Scooter
- Armature Rewinding
- Insect Electrocutors
- Electric Bicycle Pusher, etc.

YOU HAVE TOOLS—MATERIAL HANDY

Most handy men have sufficient tools around the house to tackle these simple plans and much of the necessary material can be found around workshops, garages and scrap yards. You can make your own welder with these plans and a light plant, too, if you need it.

Get this book on 3 days trial!

ONLY $1.50

Send a postcard TODAY

and the LeJay Manual will arrive C.O.D. OR, save expense and send $1.50 now (Canada, $1.75). In either case, if you are not satisfied after 3 days perusal, send it back and we will refund the $1.50.

LEJAY MFG. CO

14 LeJay Building

MINNEAPOLIS - 8 - MINN.

Leaking Boiler MADE TIGHT IN 1½ HRS.

"A hot water boiler section cracked at the lower nipple joint, causing a bad leak. The water level was lowered below the leak. The 3-inch crack was filled with Smooth-On No. 1, as was the space between the sections.

"A ¼-inch-thick plate, long enough to cover the crack, was bent to conform to the casting surface and placed under the nearby pull-up bolt. The space between plate and casting was caulked full of Smooth-On No. 1. The plate could have been held by wire run thru the space between the sections if necessary. It took 1½ hours to make the repair.

"The next day the boiler was filled with water. The repair was tight, so the boiler was put in operation and the system filled with water. It has been operating ever since, and is perfectly tight."

H. T., New Jersey

Always keep Smooth-On No. 1 on hand, for stopping leaks, sealing cracks, tightening loose parts and fixtures. Get it in economical 1¾-oz., 7-oz. or larger size at your hardware store. If they haven't it, write us.

FREE REPAIR HANDBOOK

Shows many home repair jobs as effective as the above. 40 pages. 170 diagrams. Pocket size. Easy-to-follow instructions. Paste coupon on postcard and mail today.

---- Sign and Send Now ----

Smooth-On Mfg. Co., Dept. 69,
570 Communipaw Ave., Jersey City 4, N. J.

Please send me a Smooth-On Handbook.

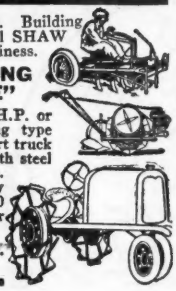
Name .....

Address .....

2-47 .....

Do it with SMOOTH-ON IRON CEMENT

SHAW "DU-ALL" and "Peppy-Pal" GARDEN TRACTORS



● 1 to 9 H.P. Circulars on request. Building more now—We supply repairs for all SHAW Tractors sold in our 42 years in business.

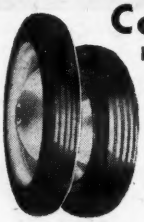
BUILD YOUR OWN RIDING TRACTOR—"WAR HORSE"

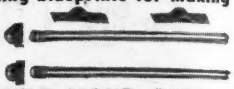
using old auto parts, powered by 2 H.P. or larger air-cooled engine; or walking type Garden Tractor ½ to 3 H.P. or convert truck or auto into Farm Tractor. Each with steel or rubber tires; will plow, cultivate. Plans for building, in few hours, any one of above, postpaid for $1.00 (state which wanted) or all 3 for $2.00. Money Back Guarantee!

SHAW MFG. CO., 2902 Front St. Galesburg, Kansas
666ME North 4th St. Columbus, Ohio

Ball-Bearing SPEED WHEEL Construction Sets

Including blueprints for making





BUILD YOUR OWN—

Express Wagons $10.70
(Includes four 8"x2" Tires, Wheels, Axles, etc.)

Midget Racers $15.20
(Includes four 10"x1.75" Tires, Wheels, Axles, etc.)

Wheelbarrow Sets $3.60
(Includes one 10"x1.75" Tire, Wheel, Axle, etc.)

Bicycle Trailers $5.10
(Includes two 8"x2" Tires, Wheels, Axles, etc.)

ORDER NOW FOR PROMPT DELIVERY

10% REQUIRED WITH C.O.D.s

JIM BROWN TOY COMPANY
1099 Home Ave. Akron 10, Ohio

TINY TIM $14.95

COMPLETE WITH BOILER AND BASE

Single cylinder Oscillating Steam Engine. A rugged high-speed precision-built engine made of highest quality material. Equipped with safety valve, throttle control and two fly wheels. Base 7" x 4". Boiler height 7½". Satisfaction or money back guarantee. Order now. Supply limited. Cash orders prepaid or C.O.D.

THE THOMPSON ENGINEERING CO.
202 Winchester Bldg., Grand Rapids 2, Mich.

ELECTRIFY your LAWNMOWER

Battery Operated . . .

SELF-CONTAINED • SELF-PROPELLED

We show you how to convert your own lawnmower for use with a car battery. Save energy, labor and time with this self-propelled unit. Our simplified plans make it easy.

Complete Plans $1.00

LEJAY MFG. CO. 214 LeJay Bldg. Minneapolis 8, Minn.

MIKE Jr. NOW ONLY $1.49

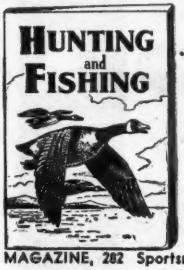
SING—TALK—AMUSE YOUR FRIENDS— through your own radio set. Practice to become an announcer. Simple to install—Not a Toy.

SEND NO MONEY—WRITE TODAY

Just send your name and address and when your MIKE Jr. arrives, pay postman $1.49 plus few cents postpaid your order. No stamps.

Sent postpaid if check or money order accompanies your order.

MART DISTRIBUTORS, Dept. I-2, P. O. Box 6, Evanston, Ill.



HUNTING & FISHING is a monthly magazine crammed full of hunting, fishing, camping, dog and boating stories and pictures, invaluable information about guns, fishing tackle, game law changes, best places to fish and hunt—countless ideas that will add more fun to your days afield.

Special Trial Offer

Send 25c in stamps or coin and we will send you Hunting & Fishing for six months.

HUNTING & FISHING
MAGAZINE, 282 Sportsman's Bldg., Boston, Massachusetts

When *you* want to fix things fast...be sure to get Weldwood Glue. It's tremendously strong... waterproof and rot-proof. Easy to apply ... quick to dry ... stain-free and permanent. At lumber dealers, chain and hardware stores, in 10¢, 25¢, 50¢ sizes and larger.

WELDWOOD
PLASTIC RESIN
WATERPROOF GLUE

UNITED STATES PLYWOOD CORPORATION
NEW YORK 18, N.Y.

VEST POCKET SIZE!

WORLD'S
LOWEST PRICED
ADDING MACHINE

Fits vest pocket or purse. Guaranteed Accurate. Operated as easily, and as reliable, as machines costing many times as much. NOT A TOY OR GADGET. Substantially made of 28-gauge steel—guaranteed for life against defects in construction. Beautiful looking, modernized design. Finished in Black, Silver and Red. You positively can't buy a Calculator of equal quality for as little money. ACCEPTED AS THE FINEST LOW PRICED CALCULATOR FOR OVER 30 YEARS! Operates with a flick of your finger. Adds, subtracts, multiplies, divides—counts up to ten million. Pays for itself over and over in mistakes avoided, and time saved.

MAKES IDEAL GIFT

Baby Calculator makes an ideal gift—for every Gift occasion. Birthday—Graduation — Christmas — Anniversaries. For men, women, children—teachers, business people, home or shop use. **COMES PACKED READY FOR GIFT WRAPPING.**

TEN DAY TRIAL
Money Back Guarantee

Because we know that our machine is the very best calculator to be obtained at this low price, we make this 10 Day Trial offer on a positive money back guarantee!! Don't buy ANY Calculator without this guarantee! Send only name and address, pay postman $2.50 plus postage (if cash is sent, we pay postage—you save up to 40c. If outside U. S., send $3.00.) Money back within 10 days if not delighted.

AGENTS WANTED

CALCULATOR MACHINE CO. (Mfrs.)
DEPT. 322, P. O. Box 248, GLENVIEW, ILL.

Free Trial
Each Baby Calculator enclosed in beautiful rich-looking Leatherette Case — at no extra cost.

ONLY $2.50 TOTAL COST
SEND NO MONEY

USE COUPON

CALCULATOR MACHINE CO. (Mfrs.)
P. O. Box 248, Dept. 322, Glenview, Ill.
Your Calculator is just what I've been looking for. Send one at once (C.O.D.) or (I am enclosing $2.50).

Name _____
Address _____
City _____ State _____

RADIO Builders, Experimenters

ONLY $5.88

Own this valuable Test Instrument!

Here's a wonderful value in an AC-DC Volt-Ohm-Milliammeter! This wide-coverage test unit with 2" moving-vane type meter reads: AC-DC volts, 0-25-50-125-250; AC-DC ma., 0-50; Resistance, 0-100,000 ohms, 2400 ohms center scale; Capacitance, .05-5 mfd. Jacks provide range selection. In black bakelite case with cord and plug. *No. 84-306. Special Price* . . . **$5.88**

GET THESE HELPFUL ALLIED RAD'O BOOKS!

Radio Formulas & Data No. 37-752 . . . 10c
Dictionary of Radio Terms No. 37-751 . 10c
Radio Circuit Handbook No. 37-753. . . 10c
Radio Builders' Handbook No. 37-750 . 10c
Simplified Radio Servicing No. 37-755 . 10c
Radio Data Handbook No. 37-754 . . . . 25c
ALL SIX BOOKS No. 37-799. . . . . 75c

Parallel-Resistance and Series Capacitance Calculator. No. 37-960 . . . 25c

R-F Resonance and Coil Winding Calculator. No. 37-955. . . . . 25c

ALLIED RADIO
833 W. Jackson Blvd. Dept. 6-B-7, Chicago 7

ORDER FROM **ALLIED RADIO**

See your ALLIED Catalog for Everything in Radio

This is the way to Make Money!

MACHINE SAW FILING with the Foley Automatic Saw Filer is the modern way to recondition saws. Anyone can do the work—no experience needed — no eyestrain. Start in spare time—Foley-filed saws cut so smooth and fast, they will advertise for you, bring you new customers and a steady repeat cash business.

The Foley is the ONLY machine that files all hand saws, also band and cross-cut circular saws,—enables you to handle work from schools, shops and factories as well as farmers, carpenters, etc.

"I bought a Foley Saw Filer, one year later had all debts paid and also $400 on a new home. Many days I earn as much as $16," says J. H. Kellogg

W. L. Tarrant writes: "I left my old job last September and in 10 months have filed 2,159 saws. We have a lovely business worked up and cannot keep up with the work."

Thor Nedrbe, Iowa, says: "I have filed 550 saws, made $350. As I m a carpenter, I just file saws in spare time—have more than I can take care of."

Send for FREE PLAN
Shows how to start—no canvassing. You can get a Foley Saw Filer now. Send coupon today.

FOLEY *Automatic* SAW FILER

FOLEY MANUFACTURING CO.
215-7 Foley Bldg., Minneapolis 13, Minnesota
Send Free Plan on Saw Filing business, no obligation

Name _____

Address _____

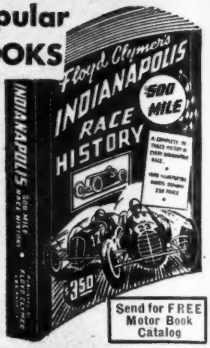
Floyd Clymer's Popular MOTOR BOOKS

1946 INDIANAPOLIS "500" RACING BOOK $1.00
80 ILLUSTRATIONS, drawings, charts, World famous driver, car data on 1946 race and highlights, George Robson racing career, $1.00. Large 320-page Indianapolis Race History, every race since 1909, 1000 illustrations. Includes 1946 book, $3.50.

FASTEST ON EARTH, by George Eyston, a racing history book of all world's straightaway land speed records since 1898, $2.00. **MERCEDES-BENZ** Grand Prix race book, 176 pages, 93 photos, $2.00.

CLYMER'S MOTOR SCRAPBOOKS Nos. 1, 2 and 3 available, $1.50 each; cloth-bound, $2.50 each. Power and Speed, $2.50. Ab Jenkins' Race History Book, $1.50. Speed—How to Obtain It, $1.50. All books postpaid. See our ad under Autos, Classified section.

CLYMER MOTORS Dept.C-2
2125 W. Pico, Los Angeles 6, Calif.



Send for FREE Motor Book Catalog

DIE-LESS DUPLICATING

Many small parts can be formed without dies, to duplicated accuracy of .001" with DI-ACRO Precision Machines.—Benders, Brakes, Shears. Save die expense and time delay. Ideal for experimental and research work, making samples, models, etc., as well as regular production runs. Write for descriptive literature.

O'NEIL-IRWIN MFG. COMPANY
384 8th Ave., Lake City, Minn.

BOYS-IT'S FREE!

This exciting book "THE WONDERS OF CHEMISTRY"
Shows how to amaze your friends with chemical magic, describes many fascinating home experiments, tells of fun, thrills, adventure and big future opportunities for boys who know chemistry. Send today!

THE PORTER CHEMICAL COMPANY
47 Prospect Avenue Hagerstown, Md.

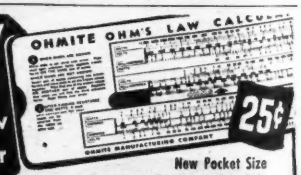
BUILD ARC WELDER FROM OLD GENERATOR

WE SHOW YOU HOW
Light or Heavy Work

Produces 75-200 amperes. Takes no previous experience or hard work to make one of these welders. Complete plans 35c. Send for your **PLANS** today and we'll include FREE our Big NEW Catalog listing hundreds of electrical bargains.

LEJAY MFG. 1314 LEJAY BLDG. MINNEAPOLIS, MINN.

NEW OHMITE Ohm's Law Calculator



New Pocket Size
Computing Scales on One Side
Gives Composition Resistor Color Code

Figures Ohms, Watts, Amperes, Volts...Quickly!

Here's a new and improved version of the famous Ohmite Calculator. Handy pocket size —9" x 3". Solves any Ohm's Law problem with one setting of the slide. No slide rule knowledge necessary. *Send 25c in coin for your Calculator.*

OHMITE MFG. CO., 4988 Flournoy Street, Chicago 44, Illinois

Two ways your face can grow in the next few years

Usually, our faces show what's happening to us. For instance, suppose financial matters are constantly on your mind. **It would be surprising if your face didn't show it.** But suppose that, on the contrary, you've managed to get yourself on a pretty sound financial basis. Naturally, your face will show *that*, too. **If you are buying and holding as many U.S. Savings Bonds as you can, you needn't worry.** Your face will be among the ones that wear a smile.

Buy all the Bonds you can... keep all the Bonds you buy

DIE CAST PULLEYS

"V" grooved for "A" belts

Die Cast Sheaves are precision bored true running pulleys made of highest quality alloy with slotted head set screws.

Part Number	Outside Dia. In.	Pitch Dia. In.	Stock Bore In.	Price
AZ15	1.50	1.25	1/2	$ .24
AZ20	2.00	1.75	1/2, 5/8, 3/4	.32
AZ30	3.00	2.75	1/2, 5/8, 3/4	.49
AZ40	4.00	3.75	1/2, 5/8, 3/4, 1	.67
AZ50	5.00	4.75	1/2, 5/8, 3/4, 1	.87
AZ60	6.00	5.75	1/2, 5/8, 3/4, 1	1.13
AZ80	8.00	7.75	1/2, 5/8, 3/4, 1	1.67
AZ100	10.00	9.75	1/2, 5/8, 3/4, 1	2.45

Also available—pillow blocks and fan blades

Kloppenberg Aluminum Foundry, Dept. MI-27, Davenport, Iowa

YOUR ELECTRIC DRILL HAS 100 OTHER USES

when used with K-Jax attachments

METAL SAWING . . . SHEARING RIVETING ATTACHMENTS

Ask your Hardware dealer or write for illustrated circular.

K-JAX, 2600 Canton St., Dallas 1, Texas

CLASSIFIED ON PAGE 180

JET PROPULSION

GAS TURBINE *Model Engine*

★ ★ Be one of the first to build a real Turbo-Jet Model Engine. Single-stage centrifugal compressor and turbine. This is a real engine, easily made with ordinary home workshop equipment. Complete plans for construction . . . design formulas and curves for checking performance and testing.

$2.00 Post paid

THE ROTOJET CO. Department 10

BOX 757 • LOS ANGELES 25 • CALIFORNIA

Smooth, steady power at your fingertips! Perform precision operations not possible with any other portable tool! With a Handee you can turn out professional-looking projects for pleasure or profit—ship, plane and train models, costume jewelry, wood carvings, puppets, initialed tumblers, etc. AC or DC. 25,000 r.p.m. Wt., 12 oz.

USE THE RIGHT ACCESSORIES—Choose them from the most complete line—more than 300 made right in the Handee plant.

GET A GOOD START with the HANDEE KIT

Handee and 45 most practical accessories packed in a compact steel case. You'll be amazed at what you can accomplish. Complete, postpaid, $27.50. Handee, with 7 accessories, $20.50.

FOR YOURSELF OR A FRIEND... THE GIFT OF A LIFETIME!

NEW PRECISION ATTACHMENTS

Fit Handee only; enable novice or craftsman to do perfect work. Magically, easily, your offhand carving, routing, shaping will be exact as to depth of cut, accuracy of line. Set of 6 with instructions, postpaid, $7.95.

FREE! New 52-page MANUAL

Order Today—Satisfaction Guaranteed!

CHICAGO WHEEL & MFG. CO.
1101 W. Monroe St., Dept. MI, Chicago 7, Ill.

Send ☐ Handee Kit ☐ Handee Tool ☐ Precision Attachments
☐ Remittance enclosed ☐ Send C.O.D. ☐ Send 52-page Manual

Name .....

Address .....

.....

NEW TOOL READY

The world-famous Mead Bandsander is ideal for home workshop use! This remarkable machine quickly shapes, sands, carves and polishes wood, metal, plastics! Works equally well on *inside* cutout openings or irregular outside edges. Gets at places no other can! Tilting table for bevelling, chamfering. Rust-and-sweat proof top. Ball bearings. Saves time, labor, money on jobs in any home or industrial shop. *Invaluable* to home-craftsmen, makers of patterns, tools, dies, signs, costume jewelry, castings, forgings, ornaments, radio and electrical parts, stampings, etc. Nothing else like it. Sold on 5 Day Trial, money back guarantee. Circular Free!

Shows use on inside cut-out openings

Cuts Fast and Clean . . . Saves Filing, Sanding Work

Bandsander

THE MACHINE THAT AMAZED THE EXPERTS!

WRITE for FREE Circular

Send for free details on "the machine that amazed the experts!" Rush a postcard today for Circular, surprisingly low price. Hurry!

MEAD SPECIALTIES CO.
4114 N. Knox Ave., Dept. 627, Chicago 41, Ill.

Be Your Own Boss

There's a great feeling to being in something for yourself, where all the profits go into your own pocket. American floor sanders make it possible for you to realize this ambition without special schooling or a big investment. Begin small and work up to as large an enterprise as you desire . . . It all depends on your ambition to get ahead.

Ask for "tell-all" booklet entitled "Opportunities in Floor Surfacing". Use coupon and enclose 25 cents in coin or stamps to cover handling.

AMERICAN
FLOOR SURFACING MACHINE CO.
531 So. St. Clair St. • Toledo 3, Ohio

Gentlemen:
Enclosed find 25c in stamps or coin for booklet "Opportunities in Floor Surfacing," telling me how I can start my own floor sanding business.

Name _____
Street _____
City _____ State _____

FINE TOOLS NEED FINE OIL!

• Lubricates
• Prevents Rust
• Cleans • Polishes

SOLD EVERYWHERE

3-IN-ONE Oil

MUFFLERS
STEELS and ALUMINUMS with a motorboat tone

SINGLES, Chev, V-8, Plymouth, Steels $5.50, Aluminum $6.50. Chry., Olds., Buicks, etc., Steels $7.50, Aluminum $8.50. V-8 and MERCURY DUALS, Steel $17.50, Aluminum $20.00. Aluminums are guaranteed for life of your car.

DEALERS WANTED

SANDEE MUFFLER CO.
7523 S. WESTERN AVE., LOS ANGELES 44, CALIF.

BIG MONEY FOR YOU IN PLASTICS

SEND 10¢ Offer includes 2 books: New Fabrication Manual & Giant Catalog, listing the most complete stock of Plastic Materials, Accessories, Tools.

BERTON PLASTICS, INC.
19 W. 21st St., N. Y. 10, N. Y.

BOOKS LOCATED!

WHAT BOOKS DO YOU WANT? *Out-of-Print and Hard-to-Find Books. World-wide search service, sooner or later* locates almost any book ever printed. List your wants for all books, old or new. Prices reasonable. No obligation. **SEARCHLIGHT BOOK WANTS, 22 East 17th St., New York 3, N. Y.**

BUILD and FLY
CLEVELAND MODELS

36" PIPER CUB
Industrial Training Model, Kit T-94 ..... **$1.50**

• ALSO: Mustang, Lightning, Black Widow—all 36" span. Dry kits. Each **$1.50**

NEW! SHOOTING STAR
Beautiful Master Flying Model. Kit absolutely complete **$3.50**

• 30" Industrial Training Model. Dry kit **$1.00**

GRUMMAN AVENGER
39¾" Scale Flying Model. MFM Kit SF-93 ..... **$4.00**

SEE your dealer first. In ordering direct, include 20c extra for packing-postage. Get our jumbo folder describing Kits from 25c to $15.00. Send Stamp **3c**

CLEVELAND MODEL & SUPPLY CO.
4513B24 Lorain Ave. Cleveland 2, Ohio, U. S. A.

NEW MIDGET ELECTRIC ARC WELDER

FULLY GUARANTEED

RETAILS ONLY $3.95

It's new! It's handy! It's efficient! Use the Midget Electric Arc Welder for hundreds of light-metal jobs. Does comparable welding work with a 1/16-inch welding rod on thin metal as that of larger and higher priced welders. Operates on 15 ampere fuse, 110 volt 60 cycle A.C. or D.C. current, by use of our special standard-coated 1/16-inch welding rods. Generous supply of rods supplied with machine. Recommended for all light welding like automobile fenders, etc. Take the Midget Arc anywhere to the job. Sturdily built and fully guaranteed. Comes complete—ready to use. Nothing else to buy. No previous welding experience needed to strike an arc. In a short time, anyone mechanically inclined can learn to weld with this machine.

You'll find hundreds of money-saving, time-saving uses for the Midget Arc around your home, garage, or workshop. Also in garages, factories, repair shops, tin shops, mechanics, farmers, inventors, etc. Order a Midget Electric Arc Welder now! SEND NO MONEY. We'll rush one to you, complete with rods and helmet (equipped with APPROVED welding glass). Pay postman only $3.95 plus postage charges. If not satisfied, return Midget Arc in 5 days from receipt and we'll refund your money immediately. RUSH YOUR ORDER NOW.

MIDGET ARC WELDER CO. STRADER AVE., DEPT. S-209 CINCINNATI 26, OHIO

NEW! 12" SHEET METAL BRAKE *Only* $12

Fits in bench vise. Quickly, easily forms all kinds of angles in sheet metal, strap iron and aluminum, wire and plastic. Use it to make useful articles, experimental research work, patent models, etc. Simple gages made for quantity duplicating. Now available. Send for details, or order direct. C.O.D. $2.00 deposit. Wt. 10 lbs.

SAMPLES OF WORK

SHEET METAL PLIERS. Forms any length, angles, chanels, and crimps in sheet metal. Jaws 2¼" wide. Price **$2.00.** Both items guaranteed.

VISE IRON BENDER. Easily bends bars any length, ½" square or round; ¼" thick up to 2" wide, without hammering, or heating. Makes angles and "U's." Strong, all steel. Price, $2.50. P.P. Immediate delivery.

VISE BRAKE MFG. CO., 1318 So. 30th Ave., Dept. MX, Omaha 5, Nebr.

BUILD YOUR OWN MACHINE TOOLS!

Blueprints $1.00-Catalog FREE

Detail construction Blueprints on 6 Lewis metal and wood-working tools postpaid for $1.00. Includes prints for Lewis 10" Shaper, Milling Machine, Drill Press, Vise, 8" Circular Saw, 6" Jointer. Castings for these tools save up to 80% of comparable new tool cost.

Illustrated 32-page Catalog—sent free with Blueprint Order—describes 21 Lewis tools. WRITE TODAY!

LEWIS MACHINE TOOL CO.
P.O. Box 7446 Sta. L, Dept. E, Los Angeles 23, Calif.

FREE BIG LAFAYETTE RADIO CATALOG

● It's NEW, it's BIG—it's Lafayette's greatest catalog of everything in radio and electronics—ready for super speed delivery—priced for super-economy. Send for this big book TODAY.

LAFAYETTE RADIO
RADIO WIRE TELEVISION INC.
100 Sixth Ave., New York 13
Boston 10 ● Newark 2

LAFAYETTE RADIO, Dept. TB-7
100 Sixth Avenue, New York 13, N. Y.
RUSH new big radio catalog to:

Name .....

Address .....

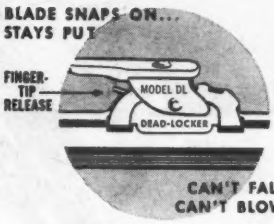
City ..... State .....

PASTE COUPON ON POSTCARD

ANCO RAIN-MASTER

"Dead-Locker"

WINDSHIELD WIPER ARMS and BLADES



(A war-born invention—by ANCO—first for military aircraft—now for your car.)

DON'T SHOOT YOUR GAS-PUMP MAN!

He's doing the best he can. Sure, he knows how dangerous it is for you to drive your car . . . in stormy weather . . . with your dull old windshield wipers that smear and smear. He'd gladly put on for you quickly a pair of keen new ANCO RAIN-MASTER Wiper Blades and Arms. He has them—Newest Models! But he forgets to remind you? Too busy? You can't shoot him for that!

PATENTS MAKE JOBS

After all, it's *your* car to protect. So *you* remind *him*. Get RAIN-MASTERS . . . patented features . . . original equipment on many makes of high grade cars and trucks . . . used in war—on our fighting tanks and trucks and ships and bombers too...because ANCO RAIN-MASTERS clean quicker, clean cleaner . . . last longer. May save you a costly smashup.

Ask for RAIN-MASTER Windshield Wiper Arms and Blades next time you buy gas.

THE ANDERSON COMPANY
Established 1918
GARY, INDIANA

A WHOLE SHOP FULL OF TOOLS IN ONE!

Use it for grinding, routing, drilling, sawing, polishing, carving, sanding and 9,994 other uses. Increases your skill and your scope. Precision-engineered, AC-DC. More exclusive features than any other tool.

Exclusive Safety Fingergrip for fine detail work

$22.50

COMPLETE WITH 36 ACCESSORIES IN FITTED STEEL CASE

$31.75 Value if Purchased Separately

Works Wood, Metal, Glass, Plastics

CASCO ELECTRI-CRAFT TOOL KIT

CASCO PRODUCTS CORPORATION, BRIDGEPORT 2, CONN.

HIGHBRIDGE'S *Best Buy* New ARMY MINE DETECTOR

AN/PRS-1 is a portable device for detecting Metallic and Non-metallic objects.

You can use them to ferret out all kinds of Buried-Treasures, in the Mountains or on the Beaches.

Its private use suggests the following: In the hills or mountains, all type of Metals and Non-metals; on the beaches any type of objects such as jewelry and coins.

For commercial use such as tracing buried cable, wire and sewer tile. Locating buried metal or wooden boundary stakes, etc.

TECHNICAL FEATURES:

This unit actually is a Ultra high Frequency transmitter. A variation in radiance resistance, caused by any change in soil density, shows in a deflection of the Microammeter, discriminating between Metallic or Non-metallic objects by a swing to the right or left. Audio response in the Headset also indicates changes by an increase or decrease in the volume of the 1000 cycle tone.

This unit comes complete with spare tubes, antenna dipole and reflector, and instructions manual, in wooden chest 9½" height x 28¼" length x 15½" depth. Weight in operation is only 22 lbs. LESS Batteries.

Power supply: Three 45 volt and one 6 volt batteries. Uses standard batteries. Original COST $285.00. Shipping Weight appr. 80 lbs. F. O. B., N. Y.

CARRYING CASE CY-BI/PRS-1

Our Special Price **$17.50**

Send Orders to: HIGHBRIDGE R.T.& A.SER. CO.
340 Canal St., New York 13, N. Y.

THOMPSON BOATS with Full Length Spray Rails

Keep passengers perfectly dry—even at high speeds. Catalog also shows two new models of "Take-Along" boats. Two big factories save you freight.

CATALOG FREE

Write for your copy. State kind of boat in which you are interested.

THOMPSON BROS. BOAT MFG. CO. (153)

230 Ann St., PESHTIGO, WIS. (Write to either place) 130 Elm St., CORTLAND, N. Y.

LEPAGE'S GLUE

LEPAGE'S MODEL AEROPLANE GLUE

LEPAGE'S LIQUID SOLDER

PLASTICS!

Fabricating plastics offers you a fascinating hobby or a profitable business. New Carmen-Bronson Plastics Handbook tells you how; gives construction plans. New Carmen-Bronson Catalog lists all needed materials—Plexiglas, Lucite, Bakelite, Lignolite, Tenite II, Lumarith in sheets, rods, tubes, special shapes—clear and glowing colors. Also plastics dyes, cements, accessories and supplies. 10c brings you both catalog and handbook. Send for them today.

CARMEN-BRONSON COMPANY
165 East 3rd Street, Dept. 2-C, Mount Vernon, N. Y.

AUTOMOBILE RACING BOOK (Fifth Edition Revised)

12 Chapters, 77 Illustrations dirt track, championship and midget cars. How to build engines, chassis and bodies. Why the fast ones are fast and how to make them fast. How to speed up Ford V-8 cars and rebuild Ford A and B engines. How world's record cars are built. Official AAA midget rules and international formula. Order NOW! $1.00 Postpaid; $1.19 C. O. D. Money back if not satisfied.

RAY F. KUNS, Dept. A-47, Cincinnati 27, Ohio

SUPER DELUXE MODEL of the famed Walton 10x2¾" wheel . . . ⅝" precision bearing . . . heavy-duty, "live rubber" national brand, puncture proof tire . . . satin smooth disc with lustrous enamel type finish . . . a massive, rugged beauty . . . $40.00 set of 4.

USE THE FINEST

WHEELS

MONEY CAN BUY!

Your wheeled project deserves the very best in wheels. And here it is . . . a heavy-duty, industrial type steel disc wheel . . . (weighs 5½ lbs.) with a ½" precision roller bearing . . . an air-cushion, puncture proof rubber tire 2¾" *thick* . . . 10" dia. *The tire itself carries a load of 200 lbs.!* Priced at only $29.95 a set of 4, complete. Send money with order. *No COD's.*

WALTON WHEEL CO.
Dept. 81, P.O. Box 432
Milwaukee 11, Wisconsin

ELECTRIC HEATING ELEMENT

FLUX

Repair burned out electric elements of coffee urns, electric stoves, flat irons, toasters, and other electrical appliances. Simply apply Christy Electric Heating Element Flux to the break, turn on the current and PRESTO the job is done and your appliance is ready again for years of satisfactory service. Generous size package (enough to repair 50 elements) sent postpaid for only $1.00.

ELECTRICAL APPLIANCE REPAIR PARTS

Renual Iron element. Guar. 1 year. Package of 6	$3.12
Toaster element forms. Clear Mica. Fits most toasters. 10 for	1.80
Heating element wire. 10 ft. coiled ¼" O.D. #20	2.55
Heating element wire. 10 ft. coiled 3/16" O.D. #22	1.77
Hot plate bricks. 5¾" diameter. 6 for	1.62
Appliance cord. Rubber covered. 20 ft. $1.00: 100 ft.	4.50
Ribbon element heating wire. Std. size. 100 ft.	.75
Percolator elements. Universal. Flat type. 1 yr. guar. 2 for	1.20
Element cement. Withstand 3000°F. 1 lb. pkg. $1.00. 5 lb. pkg.	3.50
Lead wire. Asbestos covered heater hook-up wire. 10 ft.	1.00
Iron Cord Sets with complete plug attachments. 10 for	5.00
Carbon brush set. Assorted. 104 brushes. 15 springs. Complete set	3.00

HOW TO FIX IT BOOKS

Modern Electric & Gas Refrigeration	$5.00
Practical Electricity & House Wiring	1.50
Armature & Magnet Winding	1.50

Here is your opportunity to save on repairing your own appliances and to earn extra money repairing appliances for friends and neighbors.

CHRISTY SUPPLY COMPANY

2835 N. Central Ave., Dept. T-452, Chicago 34, Ill.

HOW TO CUT RAFTERS

New vest pocket book gives lengths, Side cuts, Plumb cuts, Deductions. For all rafters for any building from one inch to forty feet wide. Gives numbers to cut on square. Also degrees for same cuts for Radial Saws. All standard pitches from ⅛ to 5⅛. Just open book to pitch page and there are your lengths, side cuts, etc. Anyone who knows what a jack rafter is can frame a roof if he has this great book. Price one dollar prepaid. **BUILDERS' TOPICS, Dept. L, Lock Box 828, Seattle, Washington.** Original teachers of the square in five easy lessons by mail. SEND FOR FREE LIST OF TECHNICAL BOOKS. Learn to read blueprints, etc.

What Every Mason Wants

We have Important Masonic Books for Blue Lodge, Chapter, Commandery, Scottish Rite, and Shrine.

OUR RITUALS ARE USED THE WORLD OVER

Send for free catalog of books and rituals for Masons, Odd Fellows, Knights of Pythias, Knights of Columbus, etc.

EZRA A. COOK, Publisher, P. O. Box C-J-Y, CF, Chicago 90, Ill.

A BIGGER, BETTER

CLASSIFIED SECTION

LOOK ON PAGE 180

Cut NEW TEETH in 3 Min.

With FOLEY RETOOTHER

***For All* HAND SAWS**

No need to grind off old teeth—cut new ones over them. Fast, accurate, no eye-strain. Cuts filing time in half.

Cuts 20 sizes of teeth from 4 to 16 points per inch. Immediate delivery.

FOLEY MFG. CO.
292-7 Foley Bldg., Minneapolis 13, Minn.
Send full details on Foley Retoother.

Name _____

Address _____

For Cabinet Finishing *use* PLASTIC WOOD

in your **HOME WORKSHOP!**

If you'd like a satiny smooth, professional finish on your next cabinet job—use Plastic Wood! It's an ideal filler for cracks or rough grains, dries tight and hard, sands to a swell finish and takes paint, lacquer or varnish perfectly. Here's an extra hint—knot holes or gouges just disappear when this handiest filler is used! *Handles like putty—hardens into wood!*

. . . dozens of other uses

FOR FILLING . . .
- Countersunk screws
- Chipped furniture
- Nail and screw holes

FOR REPAIRING . . .
- Loose casters
- Broken balusters
- Broken furniture

- *You'll want* Plastic Wood SOLVENT, *too.* Get both at one time. It is made especially to control the consistency of Plastic Wood . . . useful also in removing dried Plastic Wood from tools and fingers.

T. M. Reg. U. S. Pat. Off.

At all Hardware, Paint and 10c Stores

PLASTIC WOOD

Tube or Can

A CELLULOSE FIBRE FILLER

USE YOUR LEISURE TIME PROFITABLY with a

BURGESS vibro-tool

Decorate plastics (illustrated) in any form . . . trays, boxes, bracelets, etc. Tool leather, emboss metals, engrave jewelry, cut out cardboard signs; with a Vibro-Tool it's easy to make varied types of unusual gifts.

Vibro-Tool with Engraving Needle $7.50
(110 V. AC 60 Cycles)

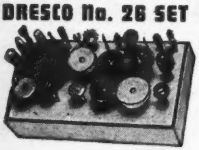
Tool and 22 accessories, with sharpening stone, in handsome hinged hardwood box, complete for only . . $16.50

SEE YOUR DEALER or Order Direct

HANDICRAFT DIVISION
BURGESS BATTERY COMPANY
174 N. WABASH AVE. • CHICAGO 1, ILL.

ACCESSORY SETS

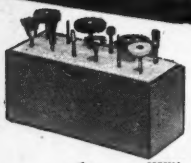
DRESCO No. 26 SET



SPECIAL INTRODUCTORY OFFER $6.00

Consists of:
- 3 Mounted Stones
- 3 Small Metal Burs
- 2 Large Size Burs
- 2 Circular Saws on Mandrel
- 1 Cut-off Disc
- 3 Ass'd Polishing Brushes
- 2 Wire Wheels on Mandrels
- 1 Felt Cylinder on Screw Type Mandrel
- 1 Rubber Polisher on Screw Type Mandrel
- 1 Baby Buff on Mandrel
- 1 Knife Edge Rubber Wheel on Mandrel
- 1 Baby Cone on Spiral Mandrel
- 1 1" Felt Wheel on Mandrel
- 1 ⅞" Rubber Wheel on Mandrel
- 1 Grinding Stone on Mandrel
- 1 Rubber Disc & Sandpaper Disc on Mandrel
- 1 ¼" Arbor Mandrel & Sanding Drum
- 1 ⅜" Arbor Mandrel & Drum

EVERY TOOL FOR YOUR WORKSHOP—ALL ACCESSORIES FOR YOUR GRINDER....



DRESCO No. 1 SET

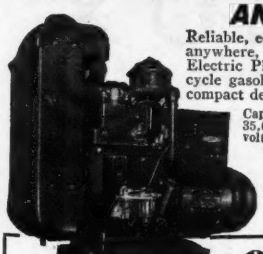
Consists of:
- 1 Wire Wheel Brush
- 1 Wire End Brush
- 3 Assorted Polishing Brushes
- 2 Mounted Grinding Stones
- 2 Metal Burs
- 1 Felt Buffer On Mandrel
- 1 Rubber Wheel On Mandrel
- 1 Large Grinding Stone On Mandrel

SPECIAL INTRODUCTORY OFFER $2.50

FREE! • ILLUSTRATED CATALOGUES OF ACCESSORIES MACHINES, HAND TOOLS NOVELTIES

DRESCO
291-5-7 ESSEX ST. BROOKLYN 8, N. Y.

ELECTRICITY FOR ANY JOB ANYWHERE



Reliable, economical electric service, anywhere, anytime with an Onan Electric Plant. Driven by Onan 4-cycle gasoline engines. Single-unit, compact design. Water or air cooled.

Capacity range: A.C.—350 to 35,000 watts in all standard voltages and frequencies. D.C.—600 to 10,000 watts, 115 and 230 volts. Battery Chargers—500 to 3,500 watts; 6, 12, 24 and 32 volts.

WRITE FOR FOLDER.

ONAN
D. W. Onan & Sons, Inc., 4825 Royalston Ave., Minneapolis 5, Minn.

THE GEM MAKER

Amateurs or professionals . . . hobbyists or jewelers . . . Polish your own gems with a B&I Gem Maker. You will find this a profitable adventure. All necessary lapidary equipment is furnished, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing, also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b., Burlington, Wis. Write today for information and literature on the Gem Maker and accessories.
B&I MFG. CO., Dept. E, Burlington, Wis.

"LITTLE WONDER" Crystal Radio

NO ELECTRIC — NO BATTERIES — NO TUBES

One of the smallest genuine crystal radio sets in the world. Slider-contact tuning, binding posts for aerial and ground. Extra long range. **SEND NO MONEY.** Just send your name and address and when your "Little Wonder" arrives simply pay the postman **$1.99** plus a few cents postage. Sent prepaid if you inclose check or money order with your order.

MART DISTRIBUTORS, Dept. I-3, P.O. Box 6, Evanston, Ill.

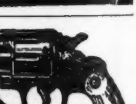
WOOD WORKERS

LUMBER—PLYWOOD AVAILABLE

Harold Hunt wants to send you big new No. 15 Catalog. Over 148 pages of woodworking ideas. 12 pages of rare woods in natural colors. UNEQUALED BARGAINS in imported and American woods, supplies, hard-to-find hardware. Send only 15c to cover postage and handling.

CRAFTSMAN WOOD SERVICE CO.
2729 S. Mary St., Dept. G78, Chicago 8, Ill.

only 15¢



New Designs in FRANZITE GRIPS

Modernize Your Gun! Improve Your Score!

Most durable grips made. Positively unbreakable! For Colt, Smith & Wesson, Hi-Standard. Ortgies, Luger & Mausers in a wide choice of beautiful designs in ivory, pearl, walnut, onyx, etc. Low prices. FREE CATALOG. Dealers Wanted.

SPORTS, INC., (Mfrs.) 5501 Broadway, Dept. R-2, Chicago 40, Ill.

CLEAN SMOOTH HANDS

OR YOUR MONEY BACK

Use amazing K-B Hand Cleaner for one week. If you don't agree K-B cleans and conditions hands better than any other hand cleaner, return bottle and we'll refund money. New, postwar formula removes paint, grease, dirt like magic. Don't let job-stained hands spoil your chances! Write today for 8-oz. bottle. Send 50c in coin, print name, address.

SEND THIS COUPON to
K-B Detergent Products Co. - P.O. Box 3084 - San Francisco 19

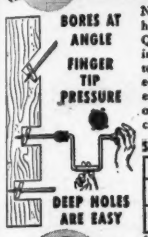
MI 246
NAME_____
ADDRESS_____
CITY_____ STATE_____

MODEL 350-B 11 boring heads: $5.95

FASTER, EASIER WOOD-BORING with this

BRUNO AUGER BIT SET

Complete with 6 boring heads (5/8" to 1-1/4") in plastic case $3.95



Now you can bore many different size holes with one auger bit...exclusive Bruno Quick-Change Boring Heads cut tool costs in half! Boring heads of finest high carbon tool steel have special extra long cutting edge...require no forward pressure, turn easily in toughest woods. No flutes to bind or clog, bores all the the way without cleaning. MONEY BACK GUARANTEE.

SEE YOUR DEALER OR WRITE DIRECT. DEPT. MI-2

Tool No.	Boring Heads	Cutting Diameters	Shank Length	Price
340-B*	6	5/8" to 1-1/4" by 8ths	8-1/16"	$3.95
350-B*	11	5/8" to 1-1/4" by 16ths	8-1/16"	5.95

*Square shanks for use in hand brace. Nos. 340, 350 straight shanks for use in bench drill, drill press, or portable drill.

BRUNO The BIG BUY in TOOLS

BRUNO TOOLS 9330 SANTA MONICA BLVD BEVERLY HILLS, CALIFORNIA

BUILD YOUR OWN ZEOLITE WATER SOFTENER

Save up to 50%. Pays for itself. Fun to build. Only a wrench required. All materials available. Send $1.00 check or money order for simple and complete plans and operating instructions.

BOX 2732 BODEY MFG. CO. MINNEAPOLIS 7, MINN.

START A BATTERY FACTORY

—at home; the latest achievement; re-cast junk batteries into new. Complete instructions. We supply everything. Big Profits!

THE BATTERY LABORATORIES

Dept. MI Minneapolis 13, Minn.

ALL-PURPOSE ARC WELDER

Weld, braze, solder, preheat any metal. Full size (shipping wt. 125 lbs.) 110 volt A. C. 125 amp. output. Voltage control for REA lines. Favorite with small shops.

Fully Equipped Ready To Use

Guaranteed for 2 years!

FORNEY MFG. CO.

FORT COLLINS 17 COLORADO

NEW *Liquid* PLASTIC

Makes 1001 OBJECTS

Hobbiests, art fans, craftsmen, home money-makers, here's a great discovery. Castolite, amazing new liquid plastic, gives beautiful effects never before possible. Now you can embed photos, flowers, coins, insects in clear liquid plastic and harden to any size or shape. Castolite comes clear or can be colored. Pours without heat. Use home tools; spoon, glass tumbler, ash tray, saucer. Saw, drill or carve. Make 1001 objects: book ends, buttons, jewelry, toys. Have pleasure; gain profit.

SPECIAL CASTO-KIT Starts You at Home—$2.95

Start with instant-use CASTO-KIT. Includes pound liquid Castolite, vial of hardener, test tube, flower castings, buffing compound, measuring dropper, abrasives, complete instructions. Make useful objects first day. Send $2.95 plus 20c postage. Or order shipped C.O.D. Or send 25c (stamps or coin) for illustrated instruction manual only. THE CASTOLITE CO., Dept. B2, Box 211, Kenilworth, Illinois.

W. A. A. ANNOUNCES NEW LOW PRICES for surplus MACHINE TOOLS

For details of the new "25% below market" price policy read this advertisement in December issues of technical magazines reaching the Metal Working Industries.

It describes the 31 types of surplus production machine tools newly repriced—tells how and where you may purchase them—gives detailed information on the policies *behind* these amazing new prices.

For even *quicker* action use this coupon to get the new price catalog. Send it to The Machine Tool Division of your nearest W.A.A. office listed below.

PRICE CATALOG—FREE

Machine Tool Division

.....Office, W.A.A.

Without obligation, please mail me your new machine tool price catalog. Part I.

Name.....Title.....

Firm.....

Address.....

City.....State.....

686-1-A

WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

Offices located at Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Douglas, Utah • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • San Antonio • San Francisco • Seattle • Spokane • Tulsa

FREE ASK FOR YOUR COPY— LATEST CAMERA CATALOG

CAMERAS • MOVIE EQUIPMENT • ENLARGERS

IMMEDIATE DELIVERY — GUARANTEED

ARGUS C3
35mm CANDID CAMERA with FLASHGUN and CASE

Shoot pictures indoors and outdoors, day and night. Excellent for color. F3.5 coated lens. Shutter speeds from 1/5 to 1/300 sec. stops fast action. Built-in coupled range-finder. Easy to operate.

$69.58 Complete with Flashgun and Leather Case

MICRO-16 CAMERA

Slip into your pocket and carry it anywhere for fast, candid shooting. Provides more pictures at less cost. All metal case, handsomely finished.

Smaller than a Pack of Cigarettes! **$29.50**

PEERLESS WILL ALLOW YOU

$5.00 or more on your present exposure meter (regardless of make, condition or where it was bought), toward the purchase of one of these photo-electric exposure meters.

WESTON MASTER II.....$29.67
G.E. DW-58 .....$26.95
DeJUR AUTOCRITIC $23.75

ORDER NOW! Write to DEPT. 22

PEERLESS CAMERA STORES

133 E. 43rd ST., NEW YORK 17, N. Y.

RUGGED! COMPACT! HANDLES BIG WORK

Thousands of owners find fun and profit with the Universal. Patented design gives you the five most useful power tools in one HEAVY fabricated-steel frame. Runs free in bronze bearings. Ideal for home or small shop.

LATHE—30" between centers. Face plate, spur center, tool rest included. **SANDER**—cuts fast and clean. 8-in. diam. disk takes any kind abrasive. **CIRCULAR SAW**—taking 6" to 8" blade. Arbor takes moulding cutters, scratch wheels, buffing wheels. **EMERY WHEEL**—5"—furnished. **DRILL PRESS**—pulls up to ½-in. drill in steel. 2" travel.

Write for literature. Shipping weight, 65 lbs. $17.50 down, balance C. O. D. Ten day trial—prompt shipment. (Motor and saw blade not included.)

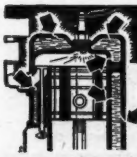
EMRICK INC. "H" CLINTON ST., KALAMAZOO 24, MICH.

New THOR "B" ENGINE-$6.95

The new THOR "B"—Sensational miniature gasoline engine that really works. Super-power performance. Smooth, velveted power that roars into action with a "twist of the wrist." Over 20,000 already sold, 1/6 H.P. Complete with coil and condenser. Ready to run, only $9.95. In KIT form, fully machined, 5 minutes to assemble, $6.95, without coil and condenser. Powers all models. Fully illustrated instructions. Send $1.00—shipped collect same day C.O.D. or send full price plus 25c extra and we ship parcel post insured.

FREE Just off the Press. Send for big 32-page illustrated hobby catalog with over 200 illustrations and over 1,000 listed items. The "Bible" of wide-awake modelers. Write for it now—no obligation, naturally!

AMERICA'S HOBBY CENTER, INC.
Dept. A27, 156 W. 22nd St., New York 11, N. Y.



REPAIR CRACKED BLOCKS AND HEADS-

External and internal leaks in blocks, cylinders and valve ports quickly and easily with LUSCO PLASTIC SEAL.

90 day Service Guaranteed or your money back. Send money order or check for full pint—more than sufficient for average repair ..... **$3.00** Postpaid

Please send dealer's name if he cannot supply you

C. F. LUSK CO., 4702 EUCLID AVE., CLEVELAND 3, OHIO

NONE BETTER!

SUPER DRILL GRINDER

Sharpens round shank drills from 3/32" to 1 1/16" in diameter, up to 11" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee.

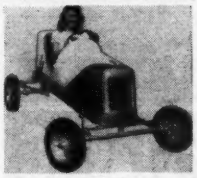
Price only $2.95
At Dealers or Postpaid

Crandall Mfg. Co. 1512 W. Slauson, Dept. FD-14, Los Angeles 44, Calif.

FENCING
HEALTHFUL SPORT

Keep fit and enjoy the exciting pastime of swordsmanship with our two 3 ft. Spring Steel Foils (swords) Safety Rubber buttons, hand guards and our Free Instruction manual —all available now for only $1.98 payable by CHECK or M. O. Add 28c for Foreign Postage.

LEE PRODUCTS CO. Dept 22 1413 FIRST AVE. N. Y. 28

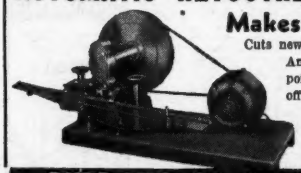


ASSEMBLE KING MIDGET

Practical highway racer runabout. We supply all parts. Just bolt together. Low cost. Ready for delivery NOW. One or two cylinder, 40 m.p.h., up to 100 miles per gallon. Send 25c for complete literature with large picture, 3-view drawings, price of parts, or send $1 for the above plus 4 actual photographs, plans for snow and ice conversion, catalogue of new and used motors, motorscooters, transmissions, clutches, other offerings, etc.

MIDGET MOTORS, Athens 3, Ohio

AUTOMATIC RETOOTHER FOR HAND SAWS



Makes New Profits

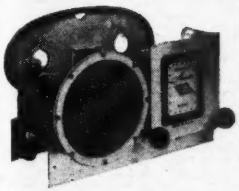
Cuts new teeth in 50 seconds! Any size tooth 4 to 16 points. Old teeth fall off as chips. Simple to operate. A perfect job.

Write Dept. MI-8

BURR MFG. CO. 8931 Venice Blvd., Los Angeles 34, Calif.

BUILD YOUR OWN RADIO
It's Easy WITH THESE NEW KITS

NEW BARGAINS AT NEWARK



● Mail Orders Filled From Either New York Or Chicago

Here they are, beginners! Two new kits. Build your own radio in jig time. It's simple with these special Meissner jobs.

● 5 tube superhet, all stations on broadcast band. Your favorite programs over a receiver you have built yourself. COMPLETE **$18.75**

● 6 tube superhet, gets Europe and America! A real job, but easy to build. Fun, experience galore. COMPLETE **$25.20**
Cabinet .. .. $5.95 extra

Both sets are complete, easy to build, fine performers. These as well as many other bargains are available now at Newark. Write for our Super Bargain Bulletins. Visit our stores, talk "shop" with our personnel, and see some great radio and electronic equipment.

NEW YORK Offices & Warehouse 242 W. 55th St., N.Y. 19 — **NEWARK** ELECTRIC COMPANY INC. — CHICAGO 323 W. Madison St. Chicago 6, Ill.

New York City Stores: 115-17 W. 45th St. & 212 Fulton St.

D4

CORROSION TROUBLE?
Use an oil that prevents rust while it lubricates
—shop appliances
—household devices
—mechanic's tools
Hardware and Sports Dealers

It's THE Triple Action Oil! Lubricates Prevents Rust Cleans

3-oz. SPOUT CAN 40¢

FIENDOIL

Genuine full-color
KODACHROME PRINTS
Now available at new low quantity prices.
Order through your Kodak dealer.
EASTMAN KODAK CO., Rochester 4, N. Y.

NEW! 12-in-1 Precision TOOL

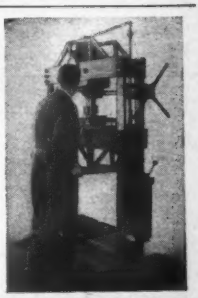
Never before such a handy multi-use tool for pocket, home, office, shop. Nothing to open—nothing to jam. Includes:
1. Screw driver 2. Adjustable nut wrench 3. Wire stripper 4. File 5. Alligator wrench 6. Staple puller 7. Glass cutter 8. Cap opener 9. Straight edge 10. Knife sharpener 11. Ruler 12. Magnet.
. . . all in one unit of fine tempered steel
You'll spend almost as much time showing it off as you will using it. **POSTPAID $1.00**
James Bishop, 28 N. Clark St., Chicago 2, Ill.

BUILD YOUR OWN! FAST FREEZER PLANS $1.00

It's easy to build this household appliance and profitable to use. Save up to 75%. Operates on 110 or 32 volts. Plans show 5 sizes and are easy to follow. **ENJOY MAKING ONE OF** these freezers from new or used parts. No expert knowledge needed. Mail $1.00 bill or check for complete plans and catalog.
LE JAY MFG., 414 LeJay Bldg., Minneapolis 8, Minn.
5 sizes 8 to 40 cu. ft.

WRITE FOR YOUR FREE COPY OF THE NEW KRW HYDRAULIC PRESS BOOK

Describes all manner of Production and Shop Work on KRW Hydraulic and Bench Type Arbor Presses. 32 pages illustrating the new KRW Hand-operated, Electric-operated and Air-operated Hydraulic Presses.
Write for your copy today.



K. R. WILSON, DEPT. 53, 215 MAIN ST., BUFFALO 3, N. Y.

MECHANIX ILLUSTRATED MAIL-ORDER MARKET

Your advertisement can reach this mail-buying audience of over 600,000 readers for only 30c per word . . . payable in advance . . . minimum 10 words. Copy to be inserted in April issue must be in office FEBRUARY 3rd. Mail to MECHANIX ILLUSTRATED, 295 Madison Avenue, New York 17, N.Y.

ADVERTISING SERVICE & AGENCIES

WANT ADS placed in Southern newspapers. Advertise your product, business or service in the South's markets. Bulletin Free. Alabama Advertising Agency, 203 Exchange Building, Birmingham 3, Ala.

ADVERTISE: 24 WORDS, 40 Newspapers $3.50. Lists Free. Advertising Bureau, 4515-B Cottage Grove, Chicago 15.

33 WORDS 25,000 CIRCULATION $2.00, Inch $4.00. Renick, Holland 1, N. Y.

24 WORDS IN 64 weeklies $4.96 J. Darnell 730 Hays, Jackson, Tenn.

AGENTS WANTED

A BUSINESS of My Own with good earnings, my own boss, working as I please, in my own allotted exclusive territory, with cash profits coming in each day I work, and starting within one hour after I first begin. That's it. Yours if you want it and will do the demonstrating. We want area distributors where none are working now. Do you have a car? And can you demonstrate and show 2 interesting products? The daily cash profits are really big. Silver Plating Liquid (Nu-Silver and Replateo Patent Trademarks) which silverplates onto Sterling and plated silverware, and also onto brass, copper, bronze, etc. Lectrik Silver Kleaner Atomic Metal Plates for de-tarnishing silverware quick by the catalytic electrolysis magnetic process. Two thrilling demonstrator products. Can you show and demonstrate them and take in the profits for yourself? Can you finance your starting stock order to work with? Then write to the NuProcess Products Laboratories, Dept. 270, Aurora, Ill., for full and free particulars by return sealed mail.

BARGAINS—SAVE up to 50%. Ladies' Hose, Lingerie, Toys, School Supplies, Razor Blades, Food Products, Punch Boards, Specialties, Carded Goods, Dry Goods, Novelties, Cosmetics, Stationery, Jewelry, Notions, Perfume, Soaps, etc. Rush Post Card for late catalog. Reliable Jobbers, 930 W. Roosevelt, Dept. C-2, Chicago 8.

EARN BIG Money, Sunshine Everyday Cards. Take orders galore from friends for America's Most Beautiful Everyday Assortment. 14 Folders. Costs 50c. Sells $1. Also 1947 Sunshine Notes, Birthday, Convalescent, Everyday Gift Wraps. Samples on approval. Write today. Sunshine Art Studios, 115 Fulton St., Dept. D-2, New York City.

SELL GREETING Cards—Everyday, Birthday, Humorous, Easter assortments. Wrappings, Stationery, Correspondence notes. Over 100 Money-makers. Special Offers. Fast sales, big profits, extra bonus. Experience unnecessary. Request $1.00 Everyday assortment on approval. Hedenkamp, 343 Broadway, Dept. F-36, New York 13.

$1 PUTS YOU in business. Sell flashy Diamond DeLux Four-in-Hand Ties. You pay $7.00 per dozen and make $5.00. Special salesman's offer, 2 flashy ties $1.00. Absolutely only one salesman's offer per person. Rush your $1.00 today and get in on the ground floor. Diamond Ties, Box 378-B-2, Oshkosh, Wisc.

PLASTONE—AMAZING new polishes for floors, furniture, autos. Beautifully packaged. Low priced. Whirlwind seller to stores, gas stations, homes. Fast repeater. Big profits. Unconditional money back guarantee. Write for free samples offer now! Plastone Company, 2207MI-2 West Chicago Ave., Chicago 22, Ill.

SILVER PLATING Liquid (contains pure silver). Simply apply with a cloth. Silver plates permanently onto silver, copper, brass, bronze and zinc. Once applied it is there to stay. Shines to a brilliant lustre. Sample Free. Nu-Lustre Products, 88 Paterson Ave., Paterson 2, N. J.

EARN MONEY quickly, easily, pleasantly showing Greeting Cards, Stationery, Wrappings. No experience needed. Up to 100% Profit. Send today for Everyday assortment on approval. Free personal Stationery folder. Thomas Terry Studios, 32 Union Avenue, Westfield, Mass.

SCHOOL SENIORS! A postal will bring you our wonder, Kwick-Sell Cardalog of popular Graduation Name Cards. Biggest profits! Only firm, giving free Souvenir Chest and card case. Don't miss out. Hurry that postal! Craftcards, Box 235(AF), Pittsburgh 30, Penna.

CALL ON Friends with Greeting Card Assortments, Easter, Birthday, other occasions, Personal Stationery, Gift Wrappings. Big Profits. Experience unnecessary. Samples on approval. Wallace Brown, 225 Fifth Avenue, Dept. E-4, New York 10.

SCHOOL SENIORS—Sell classmates America's most beautiful, distinctive Graduation Name Cards. 40% commission. Largest selection. Lowest prices. Free cards and sample kit. Printcraft, 1425 E. Elm St., Scranton 5, Penna.

EXCELLENT SIDE line for printing and advertising salesmen. Decalcomania name plates in small quantities. Great demand. Also make money applying initials on automobiles. Free samples. "Ralco," XL-Roxbury, Boston 19, Mass.

BIG BARGAINS for big profits. Over 100 sensational values. Men's used suits $2.00, pants 35c, topcoats $1.25, Overcoats $2.00, shoes 20c. Experience unnecessary. Free wholesale catalog. Superior, 1250-F Jefferson, Chicago 7.

OUR EXCLUSIVE new products bulletin service brings you listings of 100 newest items and where to get them. Latest release one dollar. W. E. Neubauer Publ., 4815 "A" Street, MX, Philadelphia 20, Penna.

WOULD YOU pay 3%—first $350 made? Color-illustrated book "505 Odd, Successful Enterprises" free! Proven! Work at home, office. Expect something odd! Pacific, 2207½D Cloverfield, Santa Monica, Calif.

AGENTS WANTED for our coin operated amusement machines in every town and community. Sell to clubs and homes; or start a route. Webb Distributing Co., Dept. M-12, 6 S. Kedzie Ave., Chicago 12, Ill.

HOUSE NUMBERS that glow in the dark. Luminous pictures, etc. Large mfr. wants factory representative. Wonderful new product. Fast seller. Free samples. Madison Mills, 303 4th Ave., N.Y.C.

NEW "SPONGE" Wall Cleaner. Erases dirt like magic. Wallpaper, painted walls, ceilings. Saves redecorating. Lightning seller. Samples sent on trial. Kristee 132, Akron, Ohio.

240 BARGAINS. USED Dresses, Clothing, Shoes, Hats and Army Goods. Write for Free Catalog. Bargains Mail Order House, 637 Broadway, Dept. TRA, N. Y. 12, N. Y.

"FORTIFY THE FUTURE" Start own business; home, office. Booklet describing "Collection of 137 Tested Plans" free. Elite Co., 220-G Grand St., New York 13, N. Y.

SELL BOOKS By Mail. Mammoth sales and huge profits. Everything furnished. Send 10c for complete details. Business Plans Foundation, Box 56-G, New York 10.

REPRESENT SAFEGUARD Moth-proofing compound in your territory. Opportunity for state distributorship. Cannon's Compounding Co., Box 246-M, Doylestown, Penna.

GREETING CARDS. 1947 Assortments ready. Stationery, Novelties. Personalized Paper Products. Raum, 4154m Fifth Street, Philadelphia 40.

SILVER PLATING Liquid, cleans plates, just rub on renews, lasting finish. Good profits. Rabiro, 228M E. 2nd St., New York 9, N. Y.

SELL PERSONALIZED soap. Name on every cake. Ideal for gifts. Get sample offer. Dunbar Soap, New Brunswick, N. J.

MANUFACTURE CLEANERS — Flavors — Cosmetics—Polishes. Formula Catalog Free. Kemico, Parkridge 60, Ill.

AGENT OR exclusive distributor for cigarette lighter mfg. Box 9, Tarzana, Calif.

AUTHORS' SERVICE

NEW WRITERS needed to rewrite ideas in newspapers, magazines and books. Splendid opportunity to "break into" fascinating writing field. May bring you up to $5.00 per hour spare time. Experience unnecessary. Write today for Free details. No obligation. Postcard will do. Comfort Press, Inc., 210-A South Seventh St., St. Louis 2, Mo.

I WANT New Writers To Cash Hundreds Of Checks For $1 To $100, Offered Each Month. The Easiest Way To Write For Pay. No Previous Experience Necessary. Send For Free Details. No Obligation. Saunders M. Cummings, 467-R Independence Bldg., Colorado Springs, Colo.

EARN SPLENDID income writing short stories and newspaper features. Easy-to-learn plan shows you how. Investigate today! Penny postal brings exclusive details. Writer's Institute, Dept. B, 4 S. 15th Street, Philadelphia 2, Pa.

AVIATION

ALUMINUM AIRPLANE Floats, dandy for airdriven or waterpropelled amphibious craft and catamarans. Two cylinder 8 h.p. aircooled engines. Small pneumatic tired wheels. Write for literature. Karl Ort, Dept. 1, York, Penna.

PASS CAA examinations. Our multiple choice questions help you. Aircraft Mechanics; Engine Mechanics; Commercial Pilots. $1.00 each. Wisconsin Aeronautical Institute, Rt. 2, Racine, Wis.

VETERANS: FLIGHT training under G. I. Bill. Private, commercial, and flight instructor ratings. Write for information. Gottschalk School of Aeronautics, Adrian, Mich.

LIGHTPLANES. ALL about them. Large Manual $1.00. Illustrated circulars on Scout, Eaglet, Seaplanes, etc., 20c. Craftsmann Books, Box 1153MI, Milwaukee 1, Wis.

JET PROPULSION Experiments. New Principle, drive boats, bicycles, model helicopters. Circular on plans. Rush name. Maupin, Tipp City 8, Ohio.

BARGAINS

GOOD "USED" self-instruction educational books on all subjects bought, sold, rented, exchanged. Satisfaction guaranteed. Complete information and 100-page illustrated bargain catalog Free! Write—Nelson Company, Chicago 5.

SHOP THESE COLUMNS WITH CONFIDENCE
ALL MECHANIX ILLUSTRATED CLASSIFIED ADS ARE GUARANTEED

100 BARGAINS. USED Dresses, Clothing, Shoes, Hats and Army Goods. Write for Free Catalog. Bargains Mail Order House, 637 Broadway, Dept. MEC, N. Y. 12, N. Y.

WHOLESALE BARGAINS catalog, directory 10c. Scarce merchandise. Latshaw Sales, Sunnyside—A, Indianapolis, Ind.

SEE OUR ad under motorscooters for midget car and racer bargains. Midget Motors Directory, Athens, Ohio.

ADULT BOOKS, 25c. Five—$1.00! Free booklogues! Hirsch, Spring Valley 1, N. Y.

SALESMEN WANTED

SALESMAN SELL service stations new amazingly fast chemical auto upholstery cleaner. Rub on with brush, wipe dirt off with rag. Removes oil, grease spots. Large profit for station. Excellent earnings and repeat business for you. Write General Sales Co., 9655 Berthold Ave., St. Louis 10, Mo.

QUICK PROFITS with individualized belts, buckles, cap badges, tie holders, uniforms. Choice of thousand emblems. Sure repeat orders. Easy-Selling outfit offer. Write Hook-Fast Company, Dept. 19, Roanoke, Va.

AMAZING NEW Zipper Shoe sells on sight. Big profits for salesmen. Leads line 200 splendid styles. Territories open. Get Free Sample Outfit. Write Consolidated Shoe, Dept. S-762, Chippewa Falls, Wis.

NEED MORE Money to meet higher living costs? Take over established Rawleigh business near you. Housewives big buyers now. Big profits. Write Rawleigh's, Dept. B-182-MOM, Freeport, Ill.

BUSINESS OPPORTUNITIES

"ALASKAN OPPORTUNITIES." $1.00 brings 1947 Copyrighted Register explaining How-When-Where to apply for Commercial Fishing-Mining-Aviation-Timber-Fur Farming Opportunities. Also, pertinent Facts about Homestead Lands, Weather, Business and vital facts for immediate application. Many men have secured lucrative jobs through this publication. This Month's Special—Government Map of Alaska Free with register. Alcan Pub. Co., 1663-B No. Highland Ave., Hollywood 28, Calif.

VENDING MACHINES. Be independent. Own a big money business operating coin machines. Earn as high as $7.00 weekly on machines costing as low as $11.75 each. Car and experience unnecessary. Routes can be operated either in your spare or full time. Act quickly. Write for details and catalogue showing our amusement games, postage machines, candy-gum-nut vendor, and scales. Parkway Machine Co., 623K W. North Ave., Baltimore 17, Md.

BRUSH PLATING Outfits connect to a battery. No tanks necessary. Almost as simple as painting. Your opportunity to make good income plating, autoparts, bathroom, fixtures, reflectors, mirrors. Get free proof and particulars that put you in a paying business of your own. Gunmetal Co., Ave. A, Decatur, Ill.

A SMALL business on less than $100 capital. No selling. No manufacturing. A dignified business in or near your neighborhood. Earnings better than comfortable living. My treatise gives every detail, only $1.00. Satisfaction or refund. James K. Hollomon, Buell Post Office, Norfolk, Va.

MECHANICALLY INCLINED Men — Own and operate general Appliance Repair shop. Complete, illustrated course shows you how. Welding, Refrigeration, Motor Repairs, How To Get Business, etc., all phases covered. Free literature. Christy Supply, Dept. 272, 2835 N. Central Ave., Chicago.

START A clock shop. Fascinating, easily learned, profitable business requiring little capital. We teach you how to repair all kinds of clocks. Information Free. Houston Clock Shop, P.O. Box 5086C, Houston, 12, Tex.

PANTS—ARMY All Wool Serge, Color Olive Drab. Waist Size 29-36. Used, Cleaned, Pressed, Repaired $2.67 a Pair. Used Olive Drab Woolen Shirts, cleaned, pressed, repaired, Sizes 13 to 15½ $1.82 Each. Army Combat Boots Repaired $3.49 or $4.47 Each, Sizes 6-11. Send $1.00 Deposit with order, balance C.O.D. plus postage. If unsatisfactory return to us Postage prepaid. Purchase price cheerfully refunded. Write for Free Catalog. Broadway Mail Order House, Dept. 93, 637 Broadway, New York, N. Y.

MAIL ORDER Profit Maker. Beginners, dealers, no matter what you've tried or are selling by mail now, get next to this new, different, fast seller. 25c brings sample, plans, details. Pass judgment on this fast selling profit maker. Money back if you say so. L. Malary, Neillsville, Wis.

COLOR CONCRETE with chemicals. Big money making Hollywood style pottery, birdbaths, without moulds. Wishing-wells, stucco-rock, benches. Marbling, cement waterpaints. 10c brings sample, literature, pictures. Hollywood Cement Craft, 8525 Wonderland, Hollywood 46, Calif.

MAIL ORDER Business course shows you how to make money, spare or fulltime. Teaches professional mail order technique —not penny-snatching schemes. Fascinating 100-page illustrated Success-Catalog Free! Write—Nelson Company, Dept. 4-03, Chicago 5.

1946 GIGANTIC DIRECTORY of Opportunities, Advertisers Supplies, Sources, Trade Information. Mail Order Ideas, Products, Wholesalers, Valuable tips—just published! Descriptive literature Free. Wilkin & Co., 118-AM East Main St., Hillsboro, Ohio.

START YOUR own advertising agency, in spare time at home. Opportunity for big earnings and permanent business. Complete operation revealed. No stock or equipment needed. Folder and proof Free. M. Snyder, Box 4907-A, Philadelphia 19, Penna.

DOLLARS DAILY. One complete money making tested plan. Instructions, Illustrations, $1.00. Early replies receive folio on second money making plan free. Work at home. Small capital. Hand-I-Work Shop, Route 9, Box 612, Portland 16, Ore.

INTERESTED IN immediate mail order cash? Read "Advance"—Voice of Mail Order. Offers Money-Making Opportunities. Personal Guidance and Benefits. Sample Copy 25c. American Mail Trade Association, 313 East 21st, Dept. 302, New York 10.

LIQUID MARBLE—make in any color Soundproof Plastic Flooring. Flexible Molds. Cast novelties, plaques, statuary. Big Money—your own business. Catalog Free. Write—Bing Products, Dept. ET 88, Broad Street, Boston 10, Mass.

BOOKKEEPERS: GENERAL ledger and tax report experience operate permanent, profitable accounting service for the smaller business. Part or full time. Simplified method. Write now! L. A. Bell, 1406 West 25th St., Cleveland 13, Ohio.

SYNTHETIC LATEX with Neoprene base for making flexible molds! Quick Drying! Safe. For home, classroom, or industry. Quart $2.00. Gallon $5.95. Full instructions. Plastercraft Supply Company, 1406 East 43rd Street, Cleveland 3, Ohio.

WHY JOB Worry? Learn Electroplating. Highly Paid, Uncrowded, Interesting Business. Gold, Silver, Nickel, Chromium, etc. Send postcard for Free booklet and proof. Plater Hyde, Dept. IC, P.O. Box 176, National City, Calif.

20TH CENTURY "Business Opportunities Book". 144 pages of Formulas, Mailorder, Homeworkers Plans. $1.00 postpaid or C.O.D. plus postage. Money back guarantee. Silver Crest Products, Dept. 4A, 3040 North Ave., Chicago 47.

OWN A mail-order paper products business. Sell envelopes, tags, bags, boxes by mail, wholesale. Tremendous demand. Steady profits. No capital necessary. Write Omaha Envelope Service, Dept. 183, 4721 California, Omaha, 3, Nebr.

WOULD YOU pay 3%—first $350 made? Color-illustrated book "505 Odd, Successful Enterprises" free! Some offer occasional "day off." Work home. Expect something odd! Pacific, 2207½D Cloverfield, Santa Monica, Calif.

MIDWESTERN MANUFACTURER desires to obtain new products for manufacture and sale. Forward general particulars of your product together with information concerning patent status to Box 125, Parma, Mich.

YOUR OWN Business. Big profits, very small capital. National organization teaches, helps, supplies everything. Interesting service business. Big demand everywhere. Americlean, 211-F N. 7th St., St. Louis 1, Mo.

$15.00 TO $25.00 A day selling leatherette and plasticlether stool covers to Lunchrooms, Taverns, Hotels, Factories, Restaurants, etc. Write today for selling outfit. Moore's Stool Cover Mfg. Co., Kent, Ohio.

START HOME Business making statuettes, plaques, artificial marble flooring, liquid marble. Make flexible molds yourself. Amazing profits. Folder free. Creative Publishers, Box 236-A, Winnetka, Ill.

START A successful Mail-Order Business. New Ideas, Original business plans, Money-making secrets and much valuable information. Details free. Beier's, 837-P North Hoffert, Bethlehem, Penna.

"BULK VENDING"—Do you like sales work? Neither do I. Let machines do it. Learn this fascinating business. Postcard brings free booklet. Machines, 1051 "L" St., San Bernardino, Calif.

POWERFUL PROGRAM for achieving personal and business success; works without expense or guesswork. Applicable for You. Free literature. Menders, 15857-E Coram Ave., Detroit 5, Mich.

CASTONE—HARDEST coldcasting composition on earth. Any mold, snow white and colors, 10 pounds assorted colors $2.00, hundred pounds $6.00. New Era Products, 1321 SE Belmont, Chicago.

COSTS 8c RETAILS $5. Mfg. Mail Order. Car Beauty Preserver—used once year. New —Different. Royalty basis. Grossed $3,000 first month, at home Plasticize, 2254 N.W. 62nd St., Miami, Fla.

LATEX FOR Making Flexible Rubber Moulds. Thoroughly Tested. No Shrinkage. Complete Instructions With Each Order. Stoneham Rubber Co., Dept. M-1, Box 244, Stoneham 80, Mass.

MAKE BIG spare or full time earnings compiling mailing lists for large advertisers. Big demand. Easy, pleasant work. No capital. Write for interesting offer. Fletcher's, Box 183, Olyoke, Mass.

MAKE BEAUTIFUL inlaid picture plaster plaques in spare time—something different. Sample mould, instructions and material—$1.00. Plastic Plaque Products, 4353 Augusta Blvd., Chicago 51.

SELL BY Mail: Mail order business is shortest cut to profitable sales. Inspiring, constructive, instructive literature sent without obligation. Earl Cratty, 385 Lenzen Ave., San Jose, Calif.

LEARN PIANO Tuning, Repairing, at home. Tremendous field! Piano parts, tools furnished. Established 1935. Empire School of Piano Tuning, 606 East University Ave., Champaign, Ill.

MAKE BIG spare or full time earnings in Mail Order. Easy pleasant work. Small Capital. Interesting details Free. Holden's, Dept. 427, 4903 Rhodes Avenue, North Hollywood, Calif.

MILLIONS HAVE been made in real estate. Why not learn how? Send 25c for "Pointers On How To Make Money." Wm. M. Wells, 5115½ Monte Vista St., Los Angeles 42, Calif.

"FIFTY PRIZE-WINNING Plans for Mail Order Operation." Guides you to a profitable business. Free details. Deeley Business Service, 126-B Lexington Ave., New York 16, N. Y.

MANUFACTURE FAST-SELLING products and novelties at home. Low cost. Big profits. Everything furnished. Write: Modern Products, 1216-T Park Row Bldg., New York 7.

GOT A Rocket in Your Pocket? Amazing Reynolds pen writes 15 years without refilling! Guaranteed. Only $3.99 postpaid. Jay Peterson, Box 752-B, Minneapolis (1), Minn.

RUBBER MOULDS for casting novelties. Latex for making moulds. Use thoroughly tested and approved products. Eastern Latex Laboratories, Box 153, Mattapan 26, Mass.

REFRIGERATION—BIG profits. Easy to learn, servicing, selling, buying, at home. Send dime for lists of wholesale suppliers and manuals. Myers Electric, Manitowoc, Wis.

BIG PAY jobs in welding. Complete welding lessons and reference books, 516 pages, 41 lessons. $2.00 copy. Money-back guarantee. Hobartweld, Box SM-1161, Troy, Ohio.

BIG MONEY in vending machines. Start small, build full time dependable cash business from profits. Free details. Becker Vending, 105-E Dewey, Brillion, Wis.

LARGE PROFITS. Complete line plexiglass ornaments and costume jewelry. Details and sample bracelet $1.00. Keystone Sales, 4022 Chippendale Ave., Phila. 36, Penna.

BOOKKEEPERS—OPERATE your own simplified "Dollar-A-Week" Bookkeeping & Tax Service. Full or spare time. Details free. Ellis, Box 202, Cedar Grove, N. C.

BE YOUR Own Boss. Get into business for yourself. Unlimited Opportunities. Spare time. Details free. H. W. Schwieger, 8404-A W. Chestnut, Wauwatosa 13, Wis.

SCRAP METAL costing 5c pound brings Dollars in finished castings. Lifetime profits. Information, Fritz Foundry & Supply, 622 N. Fulton, Allentown, Penna.

NEW YEAR Bargains, gigantic wholesale scarce merchandise directory, thousands of products and where to buy them, 25c. Home Sales, Box 12C, Oaklandon, Ind.

TREMENDOUS PROFIT selling names by mail. Send for free details about money-making, practical course. Aesir Publications, 199G East Third, New York 9.

PLASTIC — LIQUID "fiber-glass" china glazes, protects any plaster object. Pint $1.00. Gallon $3.50. New Era Products, 1321 SE Belmont, Chicago.

BUILD MIRACLE Homes. For yourself, or sellfothers. Livable, lovable, durable. Facts free. Chamberlain Co., Fitzsimons Building, Pittsburgh 22, Penna.

MAIL-ORDER OFFERS increased Income, Independence, Unlimited Possibilities. Free Literature. Manhattan House, 126-N, Lexington, New York 16.

FIFTY TESTED Mail Order Plans for profitable, fascinating Home-Operation. Details free. Manhattan House, 126-O Lexington, New York 16.

OPERATE PROFITABLE Mail order business. Splendid Opportunity. For details write Roy McKinzie, 6320 Southern St., Detroit 10, Mich.

OPERATE PROFITABLE home business selling merchandise by mail. Fast sellers. Large profits. Powell Service, 5713 Euclid, Cleveland 3, Ohio.

MAIL ORDER Selling may be your opportunity. Start small, grow big. Write for interesting literature. T-Belfort, Engineering Bldg., Chicago 6.

RUBBER-AIRLASTEX, MOLD making liquid. Pint $1.25, Gallon $5.75 with instructions. New Era Products, 1321 SE Belmont, Chicago.

MAKE "DDT" Products. My Ten Master Formulas show how. Literature Free. Howard Robinson, Ph.G., 1302-D So. Ohio, Sedalia, Mo.

10c BRINGS MAILORDERS' fastest Dollar puller. Honest Dollar orders pour in. You keep Dollars—orders filled free. Harrison, RR2, Berrien Springs, Mich.

OPERATE PROFITABLE mail order business. Splendid opportunity. For details write, Practical, 1029 Curtis St., Albany 6, Calif.

HOME MAIL business, unlimited earnings. Copyrighted instructions $1.00. Write, Edwin Garske, 3407 Fullerton Ave., Chicago 47, Ill.

SUPER X liquid molding rubber. Sample jar 25c, quart $2.00, gallon $10.00. Free instructions. W. Wooley, 115-H Donald, Peoria, Ill.

EARN UP to $2,000 year, inventing simple items for special cash markets. Ideas only. No patents. Hendrickson, Argyle (9-B), Wis.

PROFITABLE BUSINESS of your own. Local or mail order. Write Tes-Co Enterprises, Wilkes Barre, Penna., Box 189-EA.

START OWN Business—home, office; booklet describing "137 Business Plans" free. Elite Co., 220-G Grand Street, New York 13, N. Y.

LIQUID RUBBER, for making flexible molds. Literature & sample free. H. G. Chaney, 1130 E. 16th., Jacksonville 6, Fla.

MERCHANDISE AT Half Standard Advertised Price! Ken Solomon Company, 813 Broadway, Dept. M3, New York 3, N. Y.

GIGANTIC PROFITS selling Costume Jewelry. Excellent opportunity for College Students. Wm. Morris, Maywood 5, N. J.

OPERATE PROFITABLE mail order business. Splendid opportunity. For details write, Albert Taves, Zolfo Springs, Fla.

SELL BY Mail! Books and Novelties! 35 different items! Large Profits! Catalog Free! Elfco, 432 N. Wells, Chicago 10.

GOOD PRINTING will push your business. Fast service. Send copy for better prices. Humphries Printing Co., Austin, Tex.

GROW BEAN sprouts in dark room for market; pays well. Free information. Mrs. Nickell, Rt. 1, Box 456, Bend, Ore.

MAILING LIST! 3,000 Mailorder Buyers. Only $5.00 Per 1,000. Guaranteed Accurate. Vern, Box 29, Sugarhouse, Utah.

DO IT with sea shells, attractive jewelry, big profits, free instructions. Werts, 1429—56th Avenue, Oakland 3, Calif.

HANDY MEN—Earn Money Home Operating Community "Fix-It" Shop. Write Stafford, 708 Rawlings, Carbondale, Ill.

WHOLESALE ARTICLES—Scarce Merchandise. Catalogue 10c. Prince, 2314 W. McCarty St., Indianapolis 3, Ind.

QUARTER BRINGS "How to Sell by Mail" booklet. Circular free. Francine, P.O. Box 6460-B, Pittsburgh 12, Penna.

MOLD-MAKING. PLASTER Casting. Moneymaking Home Business. Literature free. Kemixal, Parkridge, Ill.

USE YOUR car for light belt work. Guaranteed Plans dollar bill. Joe's Shop, McDonalds Crs., Ont., Canada.

SWAPPERS! TRADERS! Information. Write: "Swapper's Gazette", 2836-MM Sievin, Louisville, Ky.

START PROFITABLE concrete block business. Details Free. Wm. Horne, 206 West Wilder, Tampa 3, Fla.

QUICK MONEY! "Repairing Car Batteries." At home! Easy too! Write, Batteryman, Grand Junction, Colo.

BABY SHOES preserved. Instructions, formulas, $1.00. Novelty Bronzing, Box 56, Hyde Park 36, Mass.

MAKE RUBBER Stamps. Big profits. Complete instructions $1.00. Tho. Law, 54 East 99th, New York 29.

BABY SHOES preserved. Complete instructions. Exclusive rights. M. E. Watson, Bellefontaine, Ohio

DOLLARS DAILY! Cleared $1900 in two months. Details. Loeb, 7201-C-1 Montgomery, Cincinnati.

AMAZE OTHERS. Add faster than adding machine. Free details. Math Institute, Box 633, Mobile 4, Ala.

SPLENDID OPPORTUNITY. Operate profitable business. M. H. Randall Sales Service, Haverhill, N. H.

"MONEY FROM Scraps." Details Stamp. Woodcraft Projects, 313 Lovers Lane, Gainesville, Tex.

TYPEWRITER REPAIRING instructions, standard typewriters. Webers', Box 1008, Canton, Ohio.

$46 FROM SQUARE Foot Plywood; Jigsaw necessary. Write, Woodarts, X-55, Bridgewater, Mass.

INVITATION TO income. Contact Mib Associates, Fitzsimons Building, Pittsburgh 22, Penna.

SHELLCRAFT SUPPLIES Wholesale. Dealers, etc. (Complete line.) Box 279, Bradenton, Fla.

RECAST OLD batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

$565.00 PROFIT FROM every $15.00 invested. Standard Service System, La Grange 6, Ind.

START PROFITABLE Concrete Block Business. Regal, 1366 Bellefair, Springfield, Ohio.

DOLLARS DAILY! Cleared $1900.00 in two months. Details. Duffy, M16, Covington, Ky.

PROFITABLE HOME Operated service. Details dime. Lyle, Box 385, Lombard, Ill.

HOW AND Where to obtain capital. Particulars free. Star Service, Wapakoneta, Ohio.

RENT AMIDON scaffolds to contractors. Amidon Engineering Co., Elyria, Ohio.

BATTERY REPAIRING, Rebuilding, Plate Making Plans. L. Wertz, Pekin, Ill.

MAKE $5000 YEARLY selling "specialties." I do. Carlton, Bethany, Okla.

ELECTRICAL SHOP for sale. Terms. Electric Supply, Casper, Wyo.

BUSINESS SERVICE

TO WHOM It May Concern: We will represent you in all principal cities of the world. Personal or business assignments $1 per hour. James W. Farley, Citizens Bldg., Cleveland 14, Ohio. Note: Would appreciate hearing from someone who wishes to enter this business in your city. Will send you assignments immediately. References exchanged. State qualifications.

WE WILL represent you anywhere in United States. Business assignments $2 per hour. Affiliated Public Service, Box 526, Houghton, Mich. (Associates Accepted.)

OPPORTUNITIES GALORE. Mail every day. Name listed 10c. Arthur Sibley, Mendon, Mass.

NAMES OF mail buyers on gummed labels, 500—$2.00. Sibley, R.F.D. 81-A, Milford, Mass.

CARTOONING, SIGNPAINTING, DRAWING AIDS

AMATEUR CARTOONS bought by many publishers. Long list of good markets and full instructions on selling. 25c postpaid. Lawrence & Belyea, Box 22, Ansonia Station, New York 23, N. Y.

"HOW TO Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is Free; no obligation. Simply address Cartoonists' Exchange, Dept. 352-C, Pleasant Hill, Ohio.

EARN MONEY Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle (3-B), Wis.

CARTOONISTS—14 LESSONS—Money making plans—markets. $1.00. Cartoon Studio, 1402 Charles, La Crosse, Wis.

SIMPLIFIED LETTERING Course 25c. Complete Booklet. Walt Lupton, Pico, Calif.

LEARN TO draw funny faces. Write Funny Faces, Modesto 3, Calif.

CHEMICALS & SUPPLIES

THE HOUSE of Winn, home of supplies for amateur chemists. See Winn's New Idea chemical kits and apparatus outfits for home experimenting. Send 10c for retail catalog. Established 1931. John H. Winn, Dept. 701, 124 West 23rd St., New York 11, N. Y.

HANDBOOK FOR chemical experimenters, illustrated, hundreds of experiments, 50c. Experiment booklet 15c. Supply catalog 5c. Reading Scientific Company, Reading, Penna.

LABORATORY SUPPLIES. Chemicals and Apparatus all descriptions. 36 Page Book 10c. Standard Science Supply Co., 1232 N. Paulina St., Chicago 22, Ill.

FREE CATALOG. Chemicals, supplies, books. DMI-3, Colonial Chemical, Brockton 28, Mass.

HYDROGEN! 10 CHARGES $1.00. Inflate balloons, etc. Miles Specialties, Kokomo, Ind.

EDUCATIONAL & INSTRUCTION

GOOD JOBS and a Sound, Substantial Future await you in hotel and institutional field. Men and women—all ages—needed for well-paid positions that offer color, excitement, ever-new and fascinating duties. Record-breaking travel means even greater opportunities for trained men and women in hotels, clubs and institutions. Lewis School receiving calls for managers, assistant managers, stewards, hostesses, purchasing agents and 55 other types of important positions! From coast to coast there are important positions that offer splendid opportunities for advancement in a business where you are not dropped because you are over 40. Previous experience proved unnecessary! No need to leave your job to qualify. A good grade school education, plus Lewis Training qualifies you at home, in spare time. Our National Placement Bureau helps to place you—and our amazing Certified Job Plan—actually certifies you will "make good" when placed. Write today for free book! Veterans: This course approved for Veterans' Training. Lewis Hotel Training School, Rm. LB-6468, Washington 7, D. C. (First and only School of its kind—now in its 31st year.)

WHY DON'T You Write? Writing short stories, articles, etc., will enable you to earn extra money. In your spare time we teach you to write the way newspapermen learn—by writing. Free "Writing Aptitude Test" tells whether you possess the fundamental qualities essential to successful writing. Veterans: This course approved for Veterans' Training. Write today! Newspaper Institute of America, Suite 544-B, One Park Avenue, New York 16, N. Y.

MODERN WELDING School gives thorough training for one of industry's best paid jobs. Experienced instructors. Individual attention. Non-profit institution. Qualified under G. I. Bill. Write for literature and details. Hobart Brothers Co., Box SM-1163, Troy, Ohio.

$1756-$3021 YEAR! U. S. Government Jobs! Permanent. Dependable. Men-Women. Prepare immediately for 1947 Examinations. 32-page Civil Service Book—sample coaching Free. Franklin Institute, Dept. D29, Rochester, N. Y.

GOOD "USED" self-instruction educational books on all subjects bought, sold, rented, exchanged. Satisfaction guaranteed. Complete information and 100-page illustrated bargain catalog Free! Write—Nelson Company, Chicago 5.

PREPARE YOUR own home study course on any Business, Vocational or High School subject. New low cost certified method. Free bulletin. DeVoto Schools, 35 Vicente, San Francisco 16, Calif.

DEGREES. HOME-STUDY—Catalogue Free. An Incorporated International School. Choice of Eighteen Courses. "Esoteric School of Cosmic Sciences." Audra Younkin, Secty. Chesterfield, Ind.

MEDICAL LABORATORY Technicians in great demand. We train you in your own home, in your spare time. Bulletin free. Imperial Technical Institute, Box 973-A, Austin 5, Tex.

USED CORRESPONDENCE Courses and Educational Books Bought, Sold, Rented; Catalog Free. Educational Exchange, Henagar, Ala.

SQUARE DANCE instructions, 40 dances $1.00. Wesley Rader, Y. M. C. A. Educational Dept., 25-E 16th Ave., Denver, Colo.

LEARN EASY Magic Shorthand and Touch Typing. Home study course complete, 50c. Efficiency, Box 167, Los Angeles 53, Calif.

LAY OUT, paint bold signs. Any size. Complete instructions $1.00 postpaid. Refund if dissatisfied. Cochran, Rt. 2, Newburg, Mo.

TECHNICAL, RELIGIOUS, Information books. New, used, fit your needs. Edwards, 324 North 18th, Quincy, Ill.

FORMULAS & PLANS

MAKE 50 POUNDS soap in about 50 minutes for 50c. Three ingredients. No lye, grease. Also bubble liquid. Carpet cleaner. Soap substitute. Garment cleaner. Two specialties. All 50c Coin. Smart circular free. Teycer, Chemist, Box 1287-MIM, Chicago 90.

MODERN MANUFACTURING Formulas. Everything including plastics, compositions, mold materials. 20c up. Catalog free. Houdelette, East Wareham, Mass.

FORTUNES IN Formulas and Trade secrets, practical, Authentic, Reliable. Free Literature. H. Stillman, 555 Kingston Ave., Brooklyn 5, N. Y.

METALIZING BABY Shoes. Instructions $1.00. Wilborn, 706-A Judson Rives Bldg., Los Angeles 13.

ANY FORMULA—50c or Money Back. Rayjim, Mich., Tech Dorms, Saulte Ste Marie, Mich.

HANDWRITING ANALYSIS

ANALYZE HANDWRITING. Unlimited opportunities Amateur or Professional. Illustrated Course including free individual analysis $1.98. Mayer, 681-M Market, San Francisco 5, Calif.

ANALYZE HANDWRITING for Profit. Complete Outfit $1.00. Grapho, 2404N15, Philadelphia.

LANGUAGES

LINGUAPHONE MAKES Languages Easy. At home learn to speak Spanish, French, German, Russian or any of 29 languages by quick, easy Linguaphone Conversational Method. You learn by listening. Save time, work, money. Available under GI Bill of Rights. Send for Free book. Linguaphone Institute, 75 RCA Bldg., New York 20, N. Y.

MAILING LISTS

MILLIONS OF names. State your needs. Q Service, 422 South Dearborn, Chicago.

MILITARY INSIGNIA

INTRODUCTORY OFFERS:—10 Officers Insignia 25c; 22 different American or 15 different foreign—$1.00. Illustrated catalog 10c. Hobbyguild, 35D West 32nd St., New York.

COLLECT COLORFUL army patches. Pictures, prices and sample patch only 10c. Dept. M, Insignia Mart, 703 Broadway, N. Y.

MONEYMAKING OPPORTUNITIES

"LATIN AMERICA Opportunities" $1.00 Brings Copyrighted 1947 Research Report listing Specific Firms, explaining How-When-Where to apply for Potential Jobs in Oil, Mining, Aviation, etc. Listing of Current opportunities. Pan Americana, 1663 N. Highland Ave., Hollywood 28, Calif.

$246.50 MAKING UNUSUAL secret device without skill, machinery, from former war material costing $1.50! Simple, baffling invention, unbelievably profitable! Illustrated proofs plus details other remarkable devices, free. Rolls Enterprises, 115-E West 16th, New York 11.

$1300 PROFIT—USED Ideas in Big Mail Order World Magazine. Hundreds of moneymaking opportunities. Single copy, Plus giant mail, samples, wholesale directory thousands articles; 25c coin. 1 year, $2.00. National, 322D Union Avenue, Brooklyn 11, N. Y.

ELECTRIC CLOCKS are everywhere you go, buildings, homes, parking-lots, factories. Repairs increasing. Our easy to learn course with pictures and drawings teach you how to repair these clocks. Electronic Supply Co., Box 2359C, Houston 1, Tex.

SCHOOL SENIORS—Sell classmates America's most beautiful, distinctive Graduation Name Cards. 40% commission. Largest selection. Lowest prices. Free cards and sample kit. Printcraft, 1425 E. Elm St., Scranton 5, Penna.

FLAT BROKE? Impossible! Here are the secret "Seven Cures for a Lean Purse" if it is wealth you desire. $1.00 postpaid. Postcard brings descriptive circular free. E. Kalb, 114-40 138 St., Jamaica 4, L. I., N. Y.

WE HAVE discovered a money making proposition that anyone can use. Honest, dependable, small investment. No manufacturing. Details, 25c. Allied Enterprises, Box 236, Dowagiac, Mich.

ELITE COLLECTION contains 137 separate proven money-making plans—home town and mail order. New edition. Information free. Pacific Distributors, Box 841, Oakland 4, Calif.

FELLOW WORKERS—Down with Bosses. Start Own Business—Be Independent. Booklet describing 137 Tested Plans, free. P. Padney, 307 York St., Jersey City 2, N. J.

$3000 A YEAR—Your own business—no boss —no timeclock—independence. Complete details $1.00. Satisfaction guaranteed. Home Industries, F1354 Hollywood, Columbus, Ohio.

SEWING MACHINE Repairmen make Big Money lifetime. Start neighborhood shop today. Our course repairs all makes. $1.98 Postpaid. Serviceman, Hamilton 12, Ohio.

ELITE COLLECTION. New edition, contains 137 practical Money-Making Plans; local and mail order. Particulars free. Elite Co., 220-G Grand St., New York 13, N. Y.

EARN "EXTRA money" at home. Assemble colorful handmade jewelry. Free details. Beginner's outfit, $1 (refundable). Plastic Works, 712 Kimball, Danville 1, Ill.

MAKE PHOTO-STATUES from snapshots. Simple, profitable. Reorders. Amazing details free. Brooklyn Model, 818-C Coney Island, Brooklyn 18, N. Y.

SHELLCRAFT INSTRUCTIONS Free! Make beautiful shell jewelry! Wholesale catalogue of complete line. (Buy direct.) Pace, 2117 14th, Bradenton, Fla.

LEARN BATTERY repairing, rebuilding. Engineer offers money making methods. Battery Bureau, 2225-M North 44th St., Milwaukee 8, Wis.

WHOLESALE CATALOG and Directory, 10c. Thousands of articles. Bargains galore. Stafford Sales, 961½ N. Jefferson Ave., 2, Indianapolis 1, Ind.

RECEIVE BIG Mails. Samples, magazines, literature. Name listed in directory 10c, three times 25c. Royer, 110 Towell St., Lawrence, Mass.

CARNIVAL RIDE Plans; Kiddie Auto, Toonerville Trolleys; Greased Lightning; Free Circulars. Brill, 228-E North University, Peoria, Ill.

(SENSATIONAL) TESTED (Dime) Pulling Plan. Cash in now. Details 25c (Refundable). H. Schmuck, 146 N. Grant St., York, Penna.

EARN UP to $2,000 year, inventing simple items for special cash markets. Ideas only. No patents. Hendrickson, Argyle (9), Wis.

CO-PUBLISH MAGAZINE. Many profits. 16-page booklet 10c (refundable). Goldenberg, 5209-L Lindsay, Houston 3, Tex.

ALARM CLOCKS Easily Repaired, Adjusted. Profitable Hobby. Instructions 50c. Clifford Jones, 1210M Dudley, Utica, 3, N. Y.

DETECTIVES EARN Big Money. Experience unnecessary. Particulars free. George Wagoner, 125-J West 86th, N. Y.

$$$$ DAILY! LEARN How. Read "Timely Tips Magazine," Paulding 6, Ohio. 19th Year. $1.00. Three samples, 25c.

METALLIZE BABY Shoes for Big Profits. Several methods $1.00. Tes-Co, P.O. Box 189-EC, Wilkes Barre, Penna.

$25 WEEKLY WORKING two hours daily. No canvassing or manufacturing. Lycke, Box 2471, Cleveland 12, Ohio.

PLASTIC FLOORING offers lifetime profitable business! Write Palmer Company, Station A, Berkeley, Calif.

EARN MONEY Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle (3), Wis.

"THERE'S BIG Money in Junk," and repairing batteries. Write, Batteryman, Grand Junction, Colo.

BABY SHOES preserved. Formulas, instructions, $1.00. Novelty Bronzing, Box 56 Hyde Park 36, Mass.

EARN MONEY at home—steady income—Write Successful Income Builders, 508-F, Hollywood 28, Calif.

"NYLONS," #51 Gauge, $18.00 dozen. Supply Sources 25c. Stafford, Box 5211, Indianapolis 1, Ind.

ACHIEVE INDEPENDENCE. Copyrighted method. 25c refundable. McCann, Ravine, Nutley 10, N. J.

1001 MONEY-MAKING IDEAS! Free details. Neuway Institute, Box 5463-X, Chicago 80.

SMALL CAPITAL "moneymaker." New, Unusual. Hurry. Jones, 113, Bethany, Okla.

800 CLASSIFIED WHOLESALERS $1. (64 pages.) LaSalle, 2172, Waterloo, Iowa.

POULTRY

BUILD YOUR own poultry picker. We furnish parts or complete product. Scalding tanks, gas burners, thermostatic controls, shackles, thermometers, rubber aprons, knives, etc. Bradley Mfg. Co., 13 W. Magnolia Ave., Burbank, Calif.

YOUR GREATEST poultry problem will look simple when you read American Poultry Journal regularly. 500,000 poultrymen do, why not you? 2 years 50c, 5 years $1.00. American Poultry Journal, 543 So. Clark, Chicago.

MONEY-MAKING EXPERIMENTAL Farm poultry raising helps only 25c per year. Five years $1.00. Early start increases profits. Order now! Poultry Tribune, Dept. 40, Mount Morris, Ill.

BABY CHICKS, Champion Mated. 52 varieties, 6 Hybrids, licensed inspected, bloodtested. Rush postal, large colored book Free, low prices. Berry's Farm, Route 8, Clarinda, Iowa.

HOME CANNING Supplies. New Model Sealer for Tin Cans No. 2 & 3. Get Details. Zimmerman Supply Co., Box 23, New York 16.

PROFITABLE OCCUPATIONS

"ALASKA—THE LAST FRONTIER" OFFERS THOUSANDS OF EXCELLENT OPPORTUNITIES! $1 brings OFFICIAL GOVERNMENT MAP and 1947 copyrighted report describing potential opportunities in COMMERCIAL FISHING, MINING, FUR FARMING, PROSPECTING, AVIATION, TIMBER, AGRICULTURE, LIVE STOCK RAISING, BUSINESS ENTERPRISES, GOVERNMENT HOMESTEAD LANDS. Alaska Opportunist, 6417 Homewood Ave., Dept. MI, Hollywood 28, Calif.

INTERESTED IN Latin American & foreign employment? $1 brings 1947 Foreign Service Directory listing Oil, Aviation, Mining, Transportation, Manufacturing, Construction Concerns with Foreign Interests and tips for Immediate Application. Global Reports, 6417 Homewood Ave., Dept. MI, Hollywood 28, Calif.

MECHANICALLY INCLINED Men — Own and operate general Appliance Repair shop. Complete, illustrated course shows you how. Welding, Refrigeration, Motor Repairs, How To Get Business, etc., all phases covered. Free literature. Christy Supply, Dept. 802, 2835 N. Central Ave., Chicago.

LOCKSMITHING—PROFITABLE Business or Hobby! New Course teaches you how to pick locks, fit keys, de-code, masterkey, etc. Easy self-instruction lessons. Bargain price. Fascinating 100-page illustrated catalog Free! Write Nelson Company, Dept. 2-03, Chicago 5.

WELDING—ELECTRIC Arc. Learn profitable trade quickly through actual practice. Individual welder instructions at bare cost of materials. Full particulars free. Valuable welding lessons book 50c. Hobart Welding School, Box SM-1184, Troy, Ohio.

TYPEWRITER REPAIRMEN urgently needed. Earn $40 to $50 weekly spare time. Our easy to learn home study course teaches how to repair typewriters. Write for free information. Houston Typewriter Repair Service, Box 5357C, Houston 12, Tex.

NOW IS the time to get good jobs in Florida. Bumper citrus and vegetable crops. Big tourist season. Free booklet. Florida Businessmen's Service, Box 767-C, Panama City, Fla.

TOM SAWYER Woodcraft Kits. Make and sell from home workshop using scrap lumber. Details, Carl Volz, 212 Willow Ave., Takoma Park, Md.

RAISE GIANT Chinchilla rabbits. Tremendous profits from gorgeous fur, delicious meat. Ideal business. Willow Farm, A-48, Sellersville, Penna.

BEAUTIFUL MIRRORS from window glass at 3c per foot. Formula and silvering data $1.00. Tes-Co, P.O. Box 189-EB, Wilkes Barre, Penna.

$5000 FROM HALF Acre! Growing Ginseng. Seed, contract supplied. Particulars 10c. Associated Growers, Dept. 9, St. Norbert, Manitoba.

RAISE DOMESTIC Rabbits — Interesting, Pleasant, Profitable. Instruction folio $1.00. Odette Rabbitry, PO Box 5642-IM, Dallas 2, Tex.

MUSHROOMS GROWN. Boxes. Barrels. Illustrated instructions 50c. Spawn $1.00. Gordons, 553 William, Winnipeg, Manitoba.

PANNING GOLD—Learn How. Free illustrated booklet, "How To Get Started." Old Prospector, A-24, Dutch Flat, Calif.

WASHING MACHINES. Parts for any make. Old or new. Northeast Burner, 1358 H Street, Northeast, Washington 2, D. C.

BIG MONEY selling flowers, plants. $1.50 instruction folio only 50c. Address: Robinson, Dept. A, Stephenville, Tex.

RAISE EARTHWORMS. Complete Instructions $1.00. W. L. L. Huffman, 391 Pleasant Lake, Rives Junction, Mich.

RADIO SUPPLIES & INSTRUCTION

PEP UP your car radio with a "Twin Ball Aerial Booster." Makes any five tube car radio work like a six tube. Money refunded if booster doesn't improve your car radio. Only $2.00 at dealers and postpaid or C.O.D. plus postage from A. K. Radio Electric, Worthington 1, Minn.

WESTERN ELECTRIC fixed Crystal—excellent for Crystal Sets, Many Experimental uses. Loud Steady Signal. No Adjustment. War Products. Scarce. New. Cost Govt. $6.00-prepaid. 99c. Free New List. Dept. 10, Radio City Labs., 30 Church St., N. Y. 7, N. Y.

FREE NEW Radio Catalog Is Ready! Radionic's catalog lists hard-to-get radio parts, books, amateur, test and P.A. Equipment. All available for immediate shipment. Send today to: Radionic Equipment Co., Dept. R-2, 170 Nassau St., New York 7, N. Y.

BUILD SIMPLEST one-tube AC. radio. Instructions, 25c. "All About Crystal Sets," booklet, 50c. "Loudest" crystal set instructions, 25c. Amorosee, Route Four, Richmond, Va.

FAMOUS "ALLEN" midget semi-fixed crystal detector, set building plans and 100 late crystal set distance reports all for 50 cents, postpaid. Allen, 427-M, Clinton, Mo.

FAMOUS "ALLEN" Midget semi-Fixed Crystal Detector. Set Building Plans and 100 late Crystal Set Distance Reports all for 50c Postpaid. Allen, 427-3, Clinton, Mo.

SOUND DETECTOR, bearings, watchtimer, voice walls, etc. Operates 3-6 v., d.c.; 2 designs. Drawings 50c. F. C. Ingineers, 225 W. Elk, Apt. 5, Glendale 4, Calif.

KITS, PHONES, special surplus items—new Fall list free. Dept. 14—John Baron, Box 128, Ft. Hamilton Sta., Brooklyn 9, N. Y.

LOUD SPEAKING Crystal Radio, improved design. Illustrated plans 25c. Radio Clinic, 10631 B Euclid, Cleveland 6, Ohio.

50 ASSORTED PAPER and mica condensers. Popular sizes $1.00. Balizeur, P.O. Box 91, Brooklyn 18, N. Y.

WAR SURPLUS, Machines, Tools, etc. Free literature. Wayne Engineering, Greenville 3, Ohio.

RADAR CRYSTALS. Super-sensitive. Free details. Hayes, Box 636, Santa Barbara, Calif.

BUILD ONE tube radio. Operates on 110V-A.C.-D.C. with speaker or phones. Plans 25c. Box 82, McLean, Tex.

CRYSTAL RADIO Experimenters. Write immediately to Hulet, Fairfield, Conn.

RADIO BARGAINS—Parts, Tubes.—Joe T. Morrow, Wolfe City, Tex.

STAMMERING

STOP STAMMERING. Complete Instructions $1.00. J. Allen, Box 114, Saskatoon, Sask., Canada.

TREASURE FINDER

MT-SCOPE METAL Locator Fully Guaranteed and unsurpassed in efficiency. Time payment plan, trade-in and accessories. Free Literature. Fisher Research Laboratory, Inc., Palo Alto, Calif.

PRINTING, MULTIGRAPHING, MIMEOGRAPHING, ETC.

150 HAMMERMILL 8½x11 LETTERHEADS and 150 6¾ Envelopes with your name and address beautifully printed, $2.25 postpaid. Ducit Co., Ashburn, Ga.

QUALITY PRINTING: Business, personal stationery. Prepaid Delivery. Samples free. Mero Products, 98 Morrison, Punxsutawney, Penna.

MIMEOGRAPHING—LETTERS, pricelists, formulas, instructions. Lowest prices. Lem's Letter Shop, 5712 Stanton Ave., Detroit 8, Mich.

75 HAMMERMILL LETTERHEADS With Envelopes $1.00. Benneville Printing, Box 1931, Pittsburgh 30, Penna.

MIMEOGRAPHING, PHOTOCOPYING any copy. Reasonable. Mailers Service, Box 606-B, Chicago 90, Ill.

DISTINCTIVE PRINTING reasonably priced. Free samples. Cramer, Box 993, Chicago.

PRINTING OUTFITS & SUPPLIES

"PRINTOMATIC" SELFFEEDING Post Card Stencil Printing Duplicators $9.50 Up. Office Size Duplicators, Speedprints, Hilcos, Excellographs $33.41 Up. Literature Free. Pittsburgh Typewriter Supply, 336-WF Fourth Avenue, Pittsburgh 22, Penna.

PRINTING EQUIPMENT, type and supplies. Send stamp for details or dime for complete illustrated supply book. Kelsey Inc., X-57, Meriden, Conn.

DISTINCTIVE PRINTING — Stationery, Checks, Cards. Reasonable Samples. Prices Free. Stumpprint, South Whitley 1, Ind.

RECONDITIONED TYPEWRITERS, Duplicators, Printing Devices, Supplies. Dixie-Graph, King, N. C.

INEXPENSIVE HOME-MADE printing press. Details Free. Novelty Shop, Downsville, La.

250 LETTERHEADS, ENVELOPES. Both $3.00. Mallo Press, 767-M Leith, Flint 5, Mich.

PRINTING MACHINERY, Type, Supplies. Lists 3c. Turnbaugh Service, Loysville, Penna.

RUBBER STAMPS & MARKING DEVICES

3 LINES 40c; PADS 25c; Signatures $1.75. Print-Right, Wauwatusa 13, Wis.

ONE LINE 20c; 2—35c; 3—50c; 4—65c. Rubber Stamps, Auburn, Neb.

HOBBIES & COLLECTIONS

KLONDIKE! FOR Hobby Jewelry Makers! Novelty Jewelry Findings from tables of large manufacturers—parts for Bracelets—Pins—Earrings, etc.—unfinished. Chains—Rings — Pins — Stones — Clips — Beads—many other items—1 lb. Bags—$2.00 Per Bag in 5 Bag Lots. Sample Bag—$3.00. Prepaid Only. Mdse. Distributing Co., 19 E. 16 St., New York 13

CAMPAIGN RIBBONS—Beginner's Package —Introductory Price—50c, contains 15 Assorted Ribbons. Collectors desiring Special Ribbons specify your requirements. L.H.G. Company, 19 E. 16 St., New York 13.

EXCHANGE YOUR Duplicate stamps, match covers, post cards, or any hobby, with collectors everywhere! Exchange Register listing swappers, 10c. (Mention hobby.) World Hobby House, Box 721-C, Olympia, Wash.

LEATHERCRAFT TOOLS, leather, designs, finishes, project kits, and supplies. Send for free retail catalog. Artcraft Leather of California, 271 Twelfth St., Oakland 7, Calif.

"GEM CUTTING" Profitable, Interesting Hobby, Instructive, Illustrated Booklet, One Dollar. Mineral Specimens Company, Box 1191, Santa Monica, Calif.

GENUINE GERMAN Medals, secured from overseas. Quantity limited. Other Military Souvenirs. Price list 10c. Hobbyguild, B35 West 32nd St., New York.

UNUSED MATCH book covers. 100 all different $1.00. 35 Royal Flush covers $1.00. Free list. Charles Edelman, 1311M East 84, Cleveland 3, Ohio.

HAWAIIAN PHOTOS, Curios, Novelties. Send stamp for list. Hickam Photo Studio, Hickam Housing, Honolulu, T.H.

HUNDRED DOLLARS Cash—1,000 additional Prizes. Hobby Contest, 2922—164th Street, Flushing 40, N. Y.

QUILTING? VELVETS, thread, parachutes. Lists 10c. Rainbow Co., Decherd, Tenn.

INDIAN CURIOS, RELICS, ANTIQUE FIREARMS

4 FINE ANCIENT Indian arrowheads $1.00. 4 tiny perfect bird arrowheads $1.00. Spearhead 50c. Flint knife 50c. Stone tomahawk $1.00. 10 nice perfect arrowheads $1.00. List Free. Lear's, Box 569, Galveston, Tex.

INDIAN CHIEF Head. Solid 9" casting. Finished beautiful Antique Copper. Rare gift, wall ornament $2.00. Keyes Plastics, Baltimore 9, Md.

ANTIQUE FIREARMS, swords, daggers, Indian relics. Catalogue 10c. Mart, 8 South 18th, Philadelphia 3, Penna.

INDIAN RELICS, coins, minerals, glassware. Catalog 5c. Sistershop, Northbranch, Kan.

RARE COINS

WE PAY $2.00 to $200.00 Each for Hundreds of Old or Odd Coins. Get Posted, you may have valuable coins. Send 20 cents for Illustrated Coin Value Book. 4x6. Guaranteed prices. Buying and Selling. 40 years in business. Coin Exchange, Room 7, Le Roy, N. Y.

WILL PAY $10.00 Each for Certain Lincoln Pennies! Indianheads $50.00; Dimes $1.-000.00. Catalogues 10c. Federal Coin Exchange, 1-MI, Columbus, Ohio.

FREE! FOREIGN Coin, banknote and Coin Collectors Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coinco., Springfield-9, Mass.

WE PURCHASE Indianhead pennies. Complete allcoin catalogue 10c. William Fairview, 275 Broadway, New York.

50,000 COINS, MEDALS, paper money. Illustrated lists free. Nagy, 8-A South 18th, Philadelphia 3, Penna.

THIRTY DIFFERENT Coins and Bills, $1.00. Oddehon, Box 482, St. Louis, Mo.

OLD STAMPS WANTED

I WILL pay $100.00 each for 1924 1c green Franklin stamps, rotary perforated eleven (up to $1,000.00 each unused). Send 6c today for large illustrated folder showing amazing prices paid. Vernon Baker, MI-74, Elyria, Ohio.

STAMP COLLECTING

GENEROUS PACKETS: Each 10c (11 for $1.00); 20 Africa; 12 Airmail; 25 Argentina; 30 Asia; 15 Australia; 30 Belgium; 25 Brazil; 50 British Colonies; 30 Canada; 25 China; 15 Colombia; 20 Chile; 20 Cuba; 25 Czecho; 50 Denmark; 25 Ecuador; 25 Finland; 15 Greece; 15 Guatemala; 40 Hungary; 30 India; 50 Italy; 25 Mexico; 10 Newfoundland; 15 New Zealand; 25 Netherlands; 25 Norway; 10 Paraguay; 25 Peru; 25 Portugal; 15 Russia; 25 Spain; 30 So. America; 30 Sweden; 15 Turkey; 40 U.S.; 25 Uruguay; 15 West Indies; No Approvals Sent. Longacre Shop, 102 West 42, N. Y. City.

FREE—THE ever Popular Famous Americans set of 35 stamps plus the just as desirable set of Flags (13 Stamps) plus the National Parks Set (10 Stamps) plus the complete set of Presidentials to the $5.00 (32 Stamps). A Total of 90 of the most popular United States Stamps will be given absolutely free to applicants for our brand new series of United States and Foreign approval Selections. Send 3c Postage for 15 of the above mentioned Stamps, plus full particulars. Do it Now! Triboro Stamp Co., 145 Nassau St., N.Y.C.

VATICAN CITY! Four varieties of Vatican City (world's smallest country) including portrait of Pope Pius! Also stamps from Afghanistan, Cape Juby, Libya, Macao, Palestine, Syria, Liechtenstein, San Marino, and many other interesting countries. All together 48 different stamps, total catalog price over $2.50!—only 10c to approval applicants! Methuen Stamp Service, Inc., Dept. 212, Lawrence, Mass.

POSITIVELY GREATEST free offer—Latest Scott's International $5.00 stamp album—covering entire world, contains 36,000 illustrated descriptive spaces; Scott's 1947 Standard $5.00 catalogues "Philately's Encyclopedia"—absolutely free to applicants for foreign approvals becoming customers. Bargain Stamp Service, Palm Springs, California.

ALL MECHANIX ILLUSTRATED CLASSIFIED ADS ARE GUARANTEED

WOW! $10.00 WORTH of fun only 10c. What a treasure hunt! Big package 500 foreign stamps—just as received from foreign missions, other sources. Includes stamps from Africa, South America, Philippines, Free French, Cape Juby, Palestine, etc., including airmails, commemoratives, and stamps worth up to 50c and 75c. This amazing offer is given for 10c to serious approval applicants only. One to a customer, money back if not more than delighted. Jamestown Stamp Co., Dept. 31, Jamestown, N. Y.

FREE! THE Stamp Finder! Send today for the big new edition, fully illustrated, enabling you instantly to identify all difficult stamps! Also fine packet strange, fascinating stamps from Egypt, Newfoundland, Patiala, Cyprus, etc., including maps, ships, animals and strange scenes. All free to approval applicants inclosing 3c postage. Garcelon Stamp Company, Box 975. Calais, Me.

FREE—PICK 25c worth of stamps from our first U. S. Approval Selection . . . Approximately 100 stamps to choose from . . . Excellent value . . . No obligation to buy. Lists illustrating the most popular U. S. stamps—at prices you can afford—will be included. Don't miss this opportunity! Write today. S. E. Engel, 38 Park Row, New York City.

MARVELOUS OFFER, consisting of packet containing 56 different stamps from Cayman Islands, Honduras, Malta, Manchukuo, Guadeloupe, St. Pierre, Martinique, French and British Colonies, including native scenes, ships, beasts, etc. This entire packet is sold for only 5c to approval applicants. Kent Stamp Company, G.P.O. Box 87, Brooklyn, N. Y.

$2,000 IN STAMPS Free to Contest winners. Particulars, entry blank, to approval applicants enclosing only 10c for scarce Roosevelt Mourning stamps from Nicaragua, Greece, and Argentina, plus photograph of "Roosevelt Collecting Stamps." National Stamp Sales, 276B West 43rd Street, New York 18, N. Y.

FREE! NEGRO Triangle; Turks Islands "Cactus"; Dakar; Guinea; Palestine; "Fairy Tale," Pirate Chart, Map, Ship, Sea Lion and Snake stamps; French, British, Portuguese Colonies, etc. Free for 3c postage. Approvals. Potomac Stampshop, Washington 10, D. C.

VICTORY PACKET Free. Include stamps from Tanganyika—British Cayman Islands—Animal—Scarce Babyhead—Coronation—Early Victorian—Airmail—Map Stamps—with Big Catalogue—all free—send 5c for postage. Gray Stamp Company, Dept. MM, Toronto, Canada.

15 DIFFERENT SAN Marino absolutely Free to sincere approval applicants. All mint; never hinged. Includes the famous Propaganda Stamps and other beautiful pictorials. Send 5c to cover postage. Mercury Stamp Service, Bell Gardens, Calif.

ROUND THE world Colonies, British, French, Dutch, Portuguese. Strange little known countries, Primitives, Cannibals, etc. All for 3c to Approval Buyers. Dixie Stamp Co., Dept. 1, Milwaukee 1, Wis.

SUPER! FALKLANDS, Gibraltar, Rhodesia, Morocco, Baseball Stamps, Set Kenya, numerous others. 10c to approval applicants. Antietam Stamp Co. 20 W. Baltimore St., Hagerstown, Md.

APPROVALS SENT on request with our list of stamps. First 500 answers get with order $1.00 worth free stamps. 10c for postage. Mercury Stamp Agency, Box 487, Antigonish, N. S., Canada.

FREE! RHODESIAN Bi-Colored Waterfall; Old El Salvador issues; Plus—25 different Worldwide Stamps. All Free to approval applicants. Pladon Stamps, 1717X Idaho, Toledo 5, Ohio.

31 DIFFERENT WITH George Washington Stamps from Brazil and Ecuador; Pirate Island; Victory issue; Medical set; others—all 4c with approvals. Grayson Stampco, Sherman, Tex.

LOT FOR Little! Includes set Libia, set Seychelles, set Lebanon, set Malta, set Morroco, set Panama, etc. Everything 10c to approval applicants. Inland Stamps, Wurtland, Ky.

118 DIFFERENT STAMPS including Commemoratives, Charities, Airmail, Sets, surcharges, etc., only 3c to Approval Buyers. Badger Stamp Co., Dept. X, Milwaukee 3, Wis.

STAMP EXCHANGE—Send 200 Different with dime. Will send you 200 different. L. Ward, 2108 S. Oakley Ave., Chicago 8, Ill.

GIANT BARGAIN! Contains Swazieland, Turks, Falklands, Goldcoast, Rhodesia and numerous others. Everything 10c with approvals. Paramount Stamp Co., Downey, Calif.

CUBA'S LATEST Retirement set shows aged couple receiving pension check. This set sent to approval applicants for only 5c. Bryson Stamp Company, Drawer F-5, Rossford, Ohio.

FINE APPROVALS, freshly mounted. Fast, personal service. Tell me what countries you prefer and I'll send their stamps. Mit Skinner, 438 Locust, Long Beach 2, Calif.

ASTONISHING OFFER! Over 75 diff. including Siberia, Morocco, Victoria, Mozambique, etc. Only 10c to approval applicants. M. Bernstein, 729 W. 186 St., N.Y.C.

105 DIFFERENT INCLUDING Vatican Cardinal set 10c to approval applicants. Quality Stamp Company, Dept. A, Box 202, Sta. F, Buffalo 12, N. Y.

FORTY STAMPS; 40 countries; all continents, commemoratives, bicolors, pictorials, etc. 10c to approval applicants. I. Tesmer, 218 Carlton St. Buffalo 4, N. Y.

ADEN TO Zanzibar! 40 Different British Empire including Cyprus, Malta, Dominica, 5c with approvals. Lyman Company, 95-B Nassau Street, N.Y.C. 7.

50 DIFFERENT INCLUDING scarce diamond-shaped airmail 3c to approval service applicants. Avalon Stamp Co., Dept. K, Springfield-8, Mass.

SOLOMON ISLANDS, Grenada, Turks Caicos, Caymans, Dominica—everything 2c with approvals. Viking, 130-M Clinton St., Brooklyn, N. Y.

COMPLETE "UNITED States" catalog with 1000 illustrations! Send 10 cents for mailing. Harris & Co., 22 Transit Building, Boston, Mass.

ONE CENT each and up. Most ideal way to fill your album at low cost. Fine selection sent on request. Lange, Box 21, Station R, New York 55.

UNITED STATES and foreign stamps sent on approval. Outstanding quality, low prices. Fred Herzberg, M.I. 168 Oak St., Elmhurst, Ill.

FREE. IRISH Commemorative Collection, Including Dramatic Easter Rebellion Issue With Approvals. Raymax, 123-K William St., NYC.

WHOOPIE—WOWIE! 25c worth of U.S. stamps Free! No obligations! Write: M&N Co., 742 Sheffield Ave., Brooklyn 7, N. Y.

FREE! COLORFUL Pictorial French Coat of Arms set complete! To approval applicants. Stampdom, 195 Park, Lewiston, Me.

UNITED STATES approvals, complete coverage, fine quality, attractive prices. Seminole Stamps, Box 378, Coconut Grove, Fla.

NEW ZEALAND, 60 varieties, plus airmail, Coronation and Health Sets, $1.00. W. L. Lovell, Taupiri, New Zealand.

FIVE DIFFERENT Nineteenth Century U. S.; possessions; 3c! Approvals. Ajax, Box 6009, Kansas City 4, Mo.

U. S. ROOSEVELT set, 5c. Foreign—United States approvals accompany. Yokum's, Box 1327, San Antonio 6, Tex.

4 INDIA TEMPLE Issues, plus 50 different, 15c with approvals. L. Margolin, 52 Highview Ave., Woodmont, Conn.

100 WORLDWIDE DIFFERENT stamps 5c with approvals. Boerger Stamp Company, 206½ Main, Toledo 5, Ohio.

FREE 25 DIFF. Mexico stamps with approvals. Karl Scheerer, 1736 Mahantongo St., Pottsville, Penna.

FRENCH MOROCCO, Eight different 3c, with approvals. Penny up. C. Reed, Box 323, East Orange, N. J.

VATICAN CITY—Cardinals of Trent Set Free with Approvals. Ephriams, 914 Sherman, Evanston, Ill.

30 DIFFERENT PORTUGAL 10c. Approvals on request. The Stamp Chest, Box 748, Jamestown, N. Y.

25 SWITZERLAND 10c WITH ¼, ½, 1c Approvals. Carroll's, 4357B S. Hoover, Los Angeles 37, Calif.

1000 FOREIGN DIFF. $3.50, 21000 diff. $8.00. Mendelsohn Stamp Co., 5713 Euclid, Cleveland 3, Ohio.

SHAMLESS GOYA Nude Duchess 5c to approval applicants. Germann, Greencourt, Plainfield, N. J.

FREE — COMMEMORATIVES. Airmails, Pictorials. Approvals. H. P. Wisehart, Frankfort, Ohio.

UNITED STATES $4.00, $5.00 and $10.00 stamps 5c. Approvals. M. Wineholt, Woodbine, Penna.

PHILATELIC PRINTING — stockforms. Samples. Acmeprint, Box 245, East Flat Rock, N. C.

FREE 35 DIFFERENT stamps to approval buyers. Hohowski, 305 Phila Block, Canonsburg, Penna.

"HITLER STAMPS." 12 different unused 25c. Hartunian, 1625 Laguna, Santa Barbara, Calif.

FREE! 25 DIFFERENT British Colonies with Approvals. Stamphouse, 7235 Sheridan, Chicago 26.

THREE SETS, including Triangles, 5c with approvals. Mallo, 767-M Leith, Flint 5, Mich.

FREE! SET four French, ½c up approvals. Marjay, Box 14, Station B, Brooklyn 16, N. Y.

1,000 GRABBAGS, 15c EACH. Special Bags 25c. Mandy, 630 Bingaman, Reading, Penna.

1500 STAMPS FRO.. all over the world, $1.00. Central Stamps, New Providence 9, N. J.

JAP OCCUP. and 25 Foreign. 10c with approvals. Hefler, 705 East Seventh, Fairmont, Minn.

UNITED STATES approvals. Low prices! Gordon Davison, Box 1019T, Manchester, N. H.

PORTUGUESE COLONIES. 25 different 5c with approvals. Lorin Brown, Marion, Mich.

WESTERN HEMISPHERE penny approvals. Landon Wait, 202 Magnolia, Oxnard, Calif.

50% DISCOUNT APPROVALS. Many bargains. Floyd M. Gaines, Shelbyville, Ill.

10 MINT STAMPS free with approvals. Starrett, 3401-B, Council Bluffs, Iowa.

50 DIFFERENT UNITED States, 10c. Pricelist free. Seidenberg, Cassopolis, Mich.

FREE! TINY Chinese "Midget" War set Approvals. Seminole, Elliston 8, Va.

FREE! COMPLETE Balkan aviation set with approvals. Beaman, Elliston 8, Va.

FREE! 50 DIFF. with approvals. R. Miller, Sta. P. Box 89, Brooklyn, N. Y.

UNITED STATES Approvals. Fine Quality. Klein, Box 22, Robinson, Ill.

TRY MY 1c approvals. Chick, 436 No. Main, Brewer, Me.

BODY-BUILDING COURSES

DEADLY JUDO—Fiercest fighting technique. Trick knockouts. (200 photographs—plus illustrations.) Expert instructions—Three volumes. Complete $2.25. Variety House, Box 46-DL, Wall Station, New York, 5.

HE-MAN MUSCLES make you popular, increase your self-reliance. Write for Free information. Key Institute of Physical Culture, Dept. C, Miami, Fla.

CHALK TALKS

TRICK CHALK Stunts. Catalog 10c. Cartoonist John Balda, Oshkosh, Wis.

DETECTIVES

DETECTIVES—WORK Home—Travel. Experience unnecessary. Detective Particulars free. Write, George Wagner, J-125 West 86th, N. Y.

DETECTIVE TRAINING

BE A Detective—Send for price list of self-instructional courses at reduced prices. Perkins Publications, 300-A Brandeis Theatre Bldg., Omaha, Nebr.

GAMES—ENTERTAINMENT

GLOBE-RUMMY. FREE Copies. P. O. Box 842, Denver 1, Colo.

HYPNOTISM

HYPNOTIZE ANYONE! Get the most perfect, easily learned, modern scientific course of "Genuine Hypnotism" in the world! Fully illustrated. Only $1.00. Money back guarantee. Fowler, Soldiers Field, Boston 63, Mass.

HYPNOTISM. BOOKS. Courses. Literature 10c. Dr. Lonk, D-1313, Palatine, Ill.

MAGIC TRICKS. JOKERS. PUZZLES

500 TRICKS! NEW 1946-7 Edition Douglas Famous Catalog now ready, only 10 cents. Brand new magic for pocket, parlor, club, stage, professional, amateur. America's fastest service to magicians everywhere for over 25 years. Send 10 cents today. Douglas Magicland, Dept. 3, Dallas, Tex.

MAGIC, BIG 160 page illustrated Catalog Latest Magic Goods, 25c. For over ½ century we have supplied Professional as well as Beginner. Chicago Magic Co., 2300 N. Mason, Chicago 39.

BASHFUL AS a June Bride! Magic Trick Lock opens behind your back. Puzzling! Mystifying! Send 25c to Wynn Novelty House, Dept. XD-17, 3232 Lorain, Cleveland 13, Ohio.

FREE! LARGE Catalog of magical apparatus if you remit 25c for "Magic Is Fun" magazine. Robbins Co., 152-F West 42nd Street, New York.

MASTER CIGARETTE Vanisher—will fool even your wife! 25c, including 1947 catalogue. Scheetz's, 98-2 Branch, Sellersville, Penna.

FLOATING CIGARETTE trick—cigarette floats in air. With instructions—dime. J. Eastwood, Box 623, Parkersburg, W. Va.

ENTERTAIN! MYSTIFY! New, bigger magic catalog and 4 secret tricks 25c. Herbert, M-192 N. Clark, Chicago 1.

SIDE-SHOW TRICKS Exposed 10 cents. Money making plan included. Quackenbush, Big Flats, N. Y.

MAGIC TRICKS, puzzles, books, cards, punch boards. Catalog 10c. Mechanix, Box 671, St. Louis 1, Mo.

DOLLAR MAGIC Set Free with Mammoth Catalog 25c. Magex, 4462, Germantown, Philadelphia.

LUMINOUS SKULL Free with Professional Magician's Outfit $5.00. Faxon, 306N15, Philadelphia.

16 WORLD'S BEST card tricks and catalog 25c. Sterling Magic, Box 191, Royal Oak, Mich.

300 STAMPS, ALBUM, Hinges—25c. Northeast, Box 6618, Kansas City, Mo.

CHINESE RING Illusion—Complete 25c. Ford, Box 827, Orlando, Fla.

MUSIC INSTRUMENTS & INSTRUCTION

PIANO—PLAY immediately with Latom System of Piano Playing. Melody and chords, including Boogie Woogie. No notes, no scales, no exercises, no tedious practicing. Not a picture or ear method. Free trial. Play popular standard songs immediately or pay nothing. Send $2.00 for your copy. If not completely satisfied return within 5 days for refund. Latom Music Publishing Co., Dept. C, 2147—86th Street, Brooklyn 14, N. Y.

TATTOOING SUPPLIES

TATTOOING OUTFITS—Engraving Outfits. Circulars Free. Write, Zeis, 728 Lesley, Rockford, Ill.

VENTRILOQUISM

"VENTRILLO," PROFESSIONAL Voice Throwing Instrument and Catalog 25c. 2404N15, Philadelphia.

LEARN VENTRILOQUISM, 3c stamp brings particulars. Smith, Dept. 249, 801 Bigelow, Peoria 5, Ill.

VENTRILOQUISM TEN lesson course only $1. LeSoeur, 77 Wellesley, Toronto, Canada.

BOOKS, PERIODICALS, PICTURES, POSTCARDS

MAGAZINES—BUSINESS, Trade, Professional. Keep informed on developments, opportunities, etc. Current copies. Choice over 800 periodicals. All fields. Free price-list. Commercial Engraving Publishing Co., 34W North Ritter, Indianapolis 1, Ind.

GOOD "USED" self-instruction educational books on all subjects bought, sold, rented, exchanged. Satisfaction guaranteed. Complete information and 100-page illustrated bargain catalog Free! Write—Nelson Company, Chicago 5.

POWERFUL PRESCRIPTION for achieving personal and business success; works without expense or guesswork. You can use it. Send Stamp only. G. I. Book Distributor, 126 Lexington Ave., New York City 16, N. Y.

USED EDUCATIONAL books and courses sold, rented, exchanged. Inexpensive. Money-back guarantee. Lists free. (Books and Courses bought.) Write Lee Mountain, Pisgah, Ala.

BARGAIN BUYERS Guide. 64 Page 6"x9" Supply Directory. Everything Wholesale. $1.00 (Refundable). Latshaw Sales, Sunnyside-A, Indianapolis, Ind.

POSTCARDS—BEAUTIFUL California missions, ocean views, homes, historical Southwest. 10 for 50c, 25—$1.00. Lee, 2611 University, San Diego, Calif.

AMAZING NEW book gives instant solutions to 100,000 practical problems. Details free. Columbia Graphs, Columbia 4, Conn.

NATIONAL GEOGRAPHIC Magazines, 1888-1947, any issue. Periodical Service, Box 327-MI, Swarthmore, Penna.

ILLUSTRATED COMICS. Funny—Hilarious. 10 Assorted $1.00. Latshaw, Sunnyside-A, Indianapolis 44, Ind.

BEAUTIFUL ART Pictures, 6"x8". 10 assorted 50c. Renfro, 2533 University, San Diego, Calif.

"SUN AND Fun"—Unique Hobby Magazine; pictures, cash ideas; 10c. Box 927, Kerrville, Tex.

BACK-DATE MAGAZINES, Books. Send wants. Arkell's, Box 744, Tarzana, Calif.

CAMERAS & PHOTO SUPPLIES

PHOTOGRAPHY FOR pleasure or profit. Learn at home. Practical basic training. Long established school. Write for booklet. American School of Photography, 1315 Michigan, Dept. 2042, Chicago 5.

USED CAMERA Directory, Box 1031-X, Canton, Ohio—lists hundreds of War-Bargain Used Cameras—35mm. Speed Graphics, Kodaks, Rolleiflex—many others. Send 25c for latest issue.

PHOTO FANS, make your own electronic photo timer. Send $1.00 for diagram and instructions. P. Bourget, 30 Broad St., Belmont, Mass.

FRESH MOVIE Films—100'—16mm $2.25, three rolls $6.00, 25' double 8mm $1.25. Ambassador, 479-A Quincy Street, Brooklyn, N. Y.

CAMERA FANS! We can supply film. Write: Wall's, 25 N. Linwood, Crafton, Penna.

HOME MOVIES

GORGEOUS GIRLS: Sparkling "Allure" and "Sarong Girls", two breathtaking films. 8mm, 50 ft., $2.00; 16mm, 100 ft., $4.00 each. Big illustrated 1947 catalog, silent-sound film bargains, sample—dime. Audet, Box 6520-FG, Philadelphia, 38, Penna.

"MISS AMERICA, 1946." Projection length Kodachrome sample, $1.00. Complete editions, 8mm., 50 ft., $2.00, Kodachrome, $7.50; 16mm., 100 ft., $4.00, Kodachrome, $14.75. Catalog, 25c. World In Color, Box 392-E, Elmira, N. Y.

SAVE $ BY joining Film Club. Big discounts, free membership, pamphlets and prices. Also available projectors and screens. Interstate Film Club, 179 Callender St., Boston 24, Mass.

MOVIE CAMERA Films. 100' 16mm $2.50, 25' Double 8mm $1.25. Free Developing. Better Films, 742 New Lots, Brooklyn 7, N. Y.

UNUSUAL 8-16MM. film subjects. Big catalog with sample film, 10c. National Film Exchange, Broadway Sta. E. Toledo 9, Ohio.

RENT 8mm. - 16mm. AND Sound Films by week. New catalogs. Lowest rates. Dayton Film, 2227 Hepburn, Dayton 6, Ohio.

FAMILY 8-16MM movies; slides. Lists, dime. 2-scene Kodachrome sample, dollar. Campus Films, 668-E, Ithaca, N. Y.

HOLLYWOOD FILMS. Sample and catalog 10c. Stone, Lunenburg 9, Mass.

MOTION PICTURES & SOUND EQUIPMENT

GUARANTEED FRESH anti-halo outdoor movie films. Weston 12 Daylight loading! Processing free! Three spools double 8mm, $3.45! Six single 8mm for Univex, $4.60! Postpaid! Catalog. ESO-S, 828-C West 39th, Kansas City 2, Mo.

DISTRIBUTORS WANTED. Make big money selling our new 16-mm sound specialties. Send $10 for sample movie and our free wholesale price list. Standard Pictures Corp., Dept. C, Universal City, Calif.

16MM. SOUND films. Complete subjects, good condition, often as low as $1.95 per 400' reel. Write for list of over 200 available titles. Blackhawk Films, Davenport, Iowa.

8MM.—16MM. Silent-Sound film. Complete rental library. All latest subjects. Free catalogue (sample film 10c). Garden Film, 317 West 50th, N. Y. 19.

PHOTO FINISHING

AT LAST: We Have Films: 116 & 616—38c ea., 120 & 620—33c ea., 127—27c ea. 8 exposure roll developed, all your snapshots hand-colored as beautiful as most actual colored photography—50c. Hand colored reprints—6c each. 8 exposure roll developed and black & white prints—35c. Reprints—4c each. Midwest Photo, Janesville 28, Wis.

QUALITY ENLARGEMENTS printed on best quality double weight portrait paper—5x7, 25c; 8x10, 50c; 11x14, $1.00. Oil colored enlargements 5x7, $1.25; 8x10, $2.00; 11x14, $3.00. Specify coloring. Regal Studios, P.O. Box 6335, Cleveland, Ohio.

WE COPY your favorite photo or snapshot, enlarged to 5x7, $1.00. Enlargements 5x7, 50c. 8x10, 75c. Black and white prints from color transparencies, 30c. Photoking Supply Shop, 6803 N. Clark St., Chicago 26, Ill.

PHOTOGRAPHY FOR pleasure or profit. Learn at home. Practical basic training. Long established school. Write for booklet. American School of Photography, 1315 Michigan, Dept. 2041, Chicago 5.

CENTURY DELIVERS work and service that can't be beat. Sixteen Famous Century-Tone prints each 8-exp. roll 30c. Free Mailers. Century Photo Service, LaCrosse, Wis.

2 BEAUTIFUL HI-GLOSS prints each good negative and enlarging coupon with each 6 or 8 exposure roll developed 28c. Owlphoto Co., Weatherford, Okla.

8 BEAUTIFUL DOUBLE Size pictures and roll developed 30c. 8 hour service. Free Mailers. Pacific Photo Service, Box 666, San Francisco, Calif.

ROLL DEVELOPED and 8 prints 30c. Overnight Service. Free Mailers. Tri-Plex Photo Service, Box 375, San Francisco, Calif.

WALLET SIZE Discharges, Photos, Cards. Sealed in Plastic. 50c ea. Plastection, 14 Northfield Rd., W. Orange, N. J.

8 DOUBLE-SIZE PRINTS, 30c. Pre-war quality. Quick service. Willard's, Box 3506A, Cleveland, Ohio.

ROLL, DEVELOPED, Printed. 20c. Reprints 50 for $1.00. Howards, 3760 Fremont, Chicago (13).

THREE 5x7 ENLARGEMENTS 75c. 8x10 $1.00. Fields, 1205 Avenue R, Brooklyn, N. Y.

SPECIAL—50 RE-PRINTS $1. Suburban Studio, 1410-X Bond, Rockford, Ill.

AUTOMOBILES—MIDGET CARS

FLOYD CLYMER'S Motor Books: Power & Speed $2.50—Motor Racing With Mercedes-Benz $2.00—Motor History of America $3.00—Speed, How to Obtain It $1.50—Ab Jenkins' Racing Book $1.50—Fastest on Earth racing book $2.00—Clymer's Motor Scrapbooks (old cars) Editions 1, 2 & 3 each different $1.50 each—Steam Automobile Book $2.00—Motorcycling Manual $2.00—Motorcycles, How to Manage Them $1.50—Full Throttle $3.50—Indianapolis Race History Book 1909-1946 $3.50—1946 Indianapolis Racing Book $1.00; postpaid. Motorbook catalog Free. See our ad Motorcycles classification. Clymer, Dept. C-21, 2125 W. Pico, Los Angeles 6, Calif.

1947 "CUSTOM-STYLING" MANUAL—Easily make your car luxuriously beautiful, streamlined, custom built! Newest beautifying suggestions, restyling instructions, illustrations, Plans for accessories, California mufflers, refinishing, simplified model conversions — Hollywood, sport, convertibles, jeeps, etc. $2. Almquist Engineering, 447(X) 64 Street, Brooklyn 20.

INDIANAPOLIS 1946 RACE History, including 80 illustrations, charts, drawings. World-famous car, driver data. Highlights George Robson career; $1.00. Complete Indianapolis Race History every Speedway race since 1909 including 1946. 1100 illustrations, 352 pages, $3.50 postpaid. Clymer, Dept. C-29, 2125 W. Pico, Los Angeles 6, Calif.

SPEED & MILEAGE manual—Easily obtain greater speed, mileage, racing performance from any automobile! Includes simplified methods, speed tuning, gas saving tips—instructions on building speed equipment, economizers, mufflers, superchargers, fast conversions. Racing fuels, etc. Postpaid $1.98. Almquist Engineering, 447(X) 64 Street, Brooklyn 20.

HENRY FORD, His Life—His Work book. 384 pages. 50 photographs. Complete, detailed history book of Ford Motor Company and founder, genius Henry Ford. Revised to date. $3.00; De Luxe Clothbound, $4.00, postpaid. Clymer, Dept. 25, 2125 W. Pico, Los Angeles 6, Calif.

"STREAMLINED ROADSTER"—America's lowest priced car! Beautiful, light, speedy, two passenger three-wheeler! Amazingly easy to build from inexpensive material—small motor. Instructions, drawings $1.98. Almquist Engineering, 447(X) 64 Street, Brooklyn 20.

CLYMER-TONE FINEST California style Dual Mufflers, V-8 Ford, Mercury. Increases power, reduces back pressure. $20.00 complete with pipes. Easy Installation. Specify model car. Clymer, Dept. C-27, 2125 W. Pico, Los Angeles 6, Calif.

RACING CAR performance for all cars. Increase power, speed. Special "Custom-built" equipment. Free literature. Write Lee Motorcraft, 1412-C Great Northern Bldg., Chicago 4, Ill.

NEW RACING Books. Dick Seaman, Racing Motorist, $3.50. Road Racing, $3.50. Wheels at Speed, $3.50. Wheelspin, $3.50. Midget Automobile 1946 Racing Year Book, $1.10. All postpaid. Clymer, Dept. C-22, 2125 W. Pico, Los Angeles 6, Calif.

MUFFLER MANUAL. Convert easily to Hollywood, Laguna, Westwood, duals, etc. Includes construction details, regulations, diagrams. Postpaid $1. Mellotone, Box 723X, Arcadia, Calif.

"FASTEST ON Earth" history book every World's Straightaway Speed Record. 200 pages. 70 illustrations world-famous drivers, cars. $2.00 postpaid. Clymer, Dept. C-24, 2125 W. Pico, Los Angeles 6, Calif.

CUSTOMIZE YOUR automobile. Illustrated new restyling ideas, instructions, suggestions, specific model changes by simple methods, $1. Speed Wheel, Box 723X, Arcadia, Calif.

MIDGET AUTOMOBILE Racing Book. 45 photos. Complete history 1946 California Racing. $1.10 postpaid. Clymer, Dept. C-26, 2125 W. Pico, Los Angeles 6, Calif.

MIDGET RACING Car Blueprint, 3 View Professional Layout, $1.50. Sawin, Box 31, Seekonk, Mass.

FREE CATALOG describes racing, historical, automobile, motorcycle books. 25 titles. Write Clymer, Dept. C-13, 2125 W. Pico, Los Angeles 6, Calif.

WAR SURPLUS, Machines, Tools, etc. Free literature. Wayne Engineering, Greenville 3, Ohio.

MIDGET RACERS. Blueprints, Plans, Parts, Buying Guide, 50c. Arthur Sibley, Mendon, Mass.

AUTO SUPPLIES & EQUIPMENT

DISTINCTIVE AUTOMOBILE seat covers individualized with your initials in gold. Perfectly tailored in tastefully-colored fiber and leatherette with sail-cloth or mercerized cotton. Reasonably priced. Hollywood-Craft Auto Seat Cover Co., 1948 Judson St., Los Angeles 33, Calif.

HAVING CAR trouble? New used, guaranteed auto, truck parts save money. Transmission specialists. Describe needs; immediate reply. Victory, 2930 4/8 North Western, Chicago 18.

1946 SUPERIGNITIONITER $5.50. Atomic starting, pep, mileage. E. G. Mfg., 355C East 149th, New York 55.

DUAL CARBURETORS any year. Complete blueprint $1.00. Corbcraft, 80 Maxwell, Rochester 11, N. Y.

33 MILES PER gallon. Center flow carburetor throttle. Walert, 3429 No. 10th St., Milwaukee 6, Wis.

WANT NINETEEN Nineteen Buick car or any parts for same. Burton Palmer, Ottawa, Ill.

NEW LIFE for Battery 25c. All-State, Ogden Building, Chicago 1, Ill.

AUTO TRAILERS

TRAILER, 17 FOOT Streamliner has everything. Large manual drawings, instructions, parts list $1.00. Illustrated circular 10c. Tudor Tandem 24 foot 3 room trailer. Large 24x36" six views floor plans giving principal dimensions $1.00. Craftsmann Books, Box 1153M3, Milwaukee 1, Wis.

MOTORCYCLES, BICYCLES, MOTOR SCOOTERS

FLOYD CLYMER'S Popular Motorcycle Books: Motorcycles, How to Manage Them $1.50—Motorcycling Manual $2.00—English Motorcycle Service Manual $1.50—Speed, How to Obtain It $1.50—Sample English Motorcycle Magazine 50c—Plans build attractive motor scooter $2.00—Plans Electric Bicycle $1.50. Prices postpaid. See our classified advertisement under "Automobiles." Motorbook catalog free. Clymer, Dept. C-29, 2125 W. Pico, Los Angeles 6, Calif.

CUSHMAN MOTORSCOOTER $25 complete; midget car $28; midget car less motor $10; midget motorcycle $25; German Sachs motorcycle $50, less motors; motors $3 up. Over 5400 small balloon tires $1.50 up, mail-order only. Send 25c for big post War Bargain catalogue Number 17, listing the above and hundreds of other bargains in new and used motors, motorscooters, midget cars, motorcycles, parts, plans, etc. (35c by first class mail.) Midget Motors Directory, Athens, Ohio.

MOTORCYCLE RACING Books: Speedway History, 256 pages, 50 photos world-famous riders, machines, $2.00—Stenner's Motorcycle Speedway Annual, 46 photos, complete history English, Australian Racing, $1.00 postpaid. Clymer, Desk C-21, 2125 W. Pico, Los Angeles 6, Calif.

COMPLETE STOCK of Bicycles, Tricycles, Accessories and parts. Send self addressed stamped envelope for free price list now, while supplies last. Atlas Cycle Co., 3002 Broadway, Chicago 14, Ill.

FLOYD CLYMER publications—Book of Ariel, BSA, Norton, Triumph, Villiers Engine. Complete authentic service manuals, $1.50 each postpaid. Specify title wanted. Motorcycle Speedway Racing, 256 pages, $2.00 postpaid. Clymer, Dept. C-28, 2125 W. Pico, Los Angeles 6, Calif.

BUILD SCOOTER, Midgets, Diesel conversion, Motorcycle Trailers, etc. Illustrated circular dime. Craftsmann Books, Box 1153M2, Milwaukee 1, Wis.

NEW BICYCLE Engines. 120 miles gallon. Easy installation any bicycle. Send dime for folder. Clymer, Desk C-20, 2125 W. Pico, Los Angeles 6, Calif.

LARGE STOCK Indian parts. Expert motor rebuilding. New and rebuilt. Chief Motorcycle, motors only. Indian Motorcycle Sales, Kansas City 1, Mo.

ELECTRICITY & ELECTRICAL SUPPLIES

ELECTRIC PENCIL writes—engraves all metals. Battery model $1.00—110 volt model $2.00 Postpaid. Guaranteed 5 years. C.O.D.'s Accepted. Reb Industries, Dept. 265-Z, Elmhurst, Ill.

LAMPS—IF you build or repair and had trouble finding parts—your search is ended! We have them. Harps, finials, etc, catalog 10c. Gyro Lamps, 5416 N. Clark, Chicago 40.

MAGNET, "ALNICO" 4 oz. Horseshoe, powerful (lifts about 5 lbs.), $1.00. 8 oz. (lifts 10 lbs.), $1.50 Postpaid. Ross, 68B W. Broadway, New York, N. Y.

ELECTRICAL TEST Panel Plans $1.00—Flashlight Tests Fuses Circuits $2.50. Tests All Pocket Tester $7.50. Electrical Products, Box 43, Newtonville, Mass.

FREE CATALOG of welders, welding supplies, generators, fencers, and other electrical items. Write LeJay Company, Minneapolis 8, Minn.

ELECTRIC PENCIL: Writes, Engraves all Metals. $1.00 postpaid. Beyer Mfg., 4515-G Cottage Grove, Chicago 15.

ENGINES, MOTORS

"BUILD YOUR Own" gas drive arc welder easily with Hobart Generator. Save $300 to $500, and need only add used auto engine and chassis to build portable gas drive welder that goes everywhere after profitable construction and repair jobs. Write for free instruction book, further details. Hobart Brothers Co., Box SM-1162, Troy, Ohio.

MACHINES, ENGINES

ENGINE CASTINGS. Supplies, Catalogue 10c. Howard, 13, 2417 N. Ashland, Chicago, Ill.

MACHINERY, TOOLS & SUPPLIES

IT'S EASY to build your own metal and woodworking tools from Lewis Castings, Materials and Blueprints—and at savings up to 80%! Lewis Mills, Shapers, Drillpresses and other shop tools have ample capacity and performance for home workshop jobs. New Catalog—sent on receipt of 10c to cover mailing—describes 23 Lewis Tools. Address Lewis Machine Tool Co., P. O. Box 116, 3217 Union Pacific Ave., Dept. E-10, Los Angeles 23, Calif.

INVENTION. NEW Principle. How to make Portable Power Hammers. Any size. Tack hammer—Pile driver. Electric, Gasoline. Simple, easy. No gears, cranks. Circular on plans. Rush name. Maupin, Tipp City 2, Ohio.

DRILL GRINDER—Grinds drills to factory accuracy. Calipers with direct reading scales. Circle cutters. New Tool grinder. Lowest prices. Free literature. Factory, 811-C East 31st, Kansas City 3, Mo.

LATHE CHUCKS—3 and 4-jaw threaded for 1½"-8 thread spindle. Other tools at bargain prices. Immediate delivery. Write for free catalog! Kacy Supply Co., 213 Sycamore St., Genoa, Ill.

PAINT SPRAYER outfits, complete with reconditioned 110 volt A-C-DC motor. Ready to use. $14.50. B. Price, 1394-A Fulton Ave., Bronx, N.Y.C., N. Y.

HARDEN ALL steels quickly, safely. Lasts indefinitely. Ingredients with instructions $1. Roman Nejelski, Box 185, Fort Wayne, Ind.

BUILD 8" TILT, adjustable saw. Cost $4. 24 drawings, instructions, photograph $1. Cornelius Tools, 2511 Gay St., Ft. Wayne 5, Ind.

MAKE CIRCULAR saw with our ball bearing arbors; prints, 25c. Bazuin, 76 Auburn Ave. N.E., Grand Rapids (3), Mich.

BRASS, COPPER, aluminum, stainless steel, monel. List 10c. Hobby Supply House, Box 2014, Pittsburgh 30, Penna.

FOR SALE, automatic Foley saw filer F-16, new. $150 without motor. F. B. McShan, Box 22, Needles, Calif.

WAR SURPLUS, Machines, Tools, etc. Free literature. Wayne Engineering, Greenville 3, Ohio.

5 POWERFUL ALNICO magnets $1.00. Ronald Eyrich, Box 849, Milwaukee-1.

DRILL GRINDER for twist drills $2.95. See ad on page 178.

MANUFACTURING

MANUFACTURING, STAMPING, designing, developing and experimental work; tools, dies, jigs, fixtures, models made by experts. A complete service available once again following interruption by war work. Technical Development Co., Dept. M-2, 157 Chambers Street, New York 7, N. Y.

PLASTIC MOLDING and Fabricating. Any quantity. Quick Service! Plastic Products Co., 211—7th St. S.E., Canton 2, Ohio.

WELDING—PLATING—SOLDERING

NEW MODEL electric welder 110 volt AC-DC; will weld all metals; easy to use; full directions. Complete with power unit, flame and metallic arc attachments, carbons, fluxes, rods, mask; all for $19.95—Used by the Navy. Magic Welder Mfg. Co., 239-MI Canal St., N. Y. City.

GUARANTEED 110/220 VOLT A.C. arc welders, heavy-duty, portable. 125 ampere capacity, $68.00 with complete supplies. Others to 380 amperes. Free illustrated details. Williams Welding, Box 4100, Portland 8, Ore.

BUILD D.C. Arcwelder without rewinding armature. Plans $1.00 each. 25 to 600 amperes from Automotive d.c. motors, light plant generators, automobile starter-generators. Welders Club, BB-3432, Chicago 54.

BUILD PROVEN 10-250 Amp. 220 volt A. C. Welder. Used successfully in Industrial Plants past seven years. Low cost. Complete instructions $3.50. Wesco Mfg. Co., Marshall, Tex.

WELD, CUT, braze with gasoline! Amazing new discovery shatters costs. Boosts profits. Important! Write Matthews Mfg. Co., Calgary, Canada.

FOR INVENTORS

INVENTORS: LEARN how to protect your invention. The patent laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. The United States Patent Office advises the inventor to engage a competent, registered patent attorney to represent him. We offer inventors experienced, conscientious counsel and prompt, confidential service. A specially prepared booklet containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 73A-A District National Building, Washington, D. C.

INVENTORS—PATENT Laws encourage the development of inventions. The Rules of Practice of the U. S. Patent Office advises—unless an inventor is familiar with such matters—that he employ a competent registered attorney, as the value of patents depends largely upon the skillful preparation of the specifications and claims. Write for further particulars as to patent protection and procedure and "Invention Record" form at once. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 138-C Victor Building, Washington 1, D. C.

INVENTORS—VICTOR J. Evans and Co., has a staff of registered patent attorneys, available to represent inventors in the preparation and prosecution of their cases before the U. S. Patent Office. Detailed information and the steps to take to obtain patent protection will be sent to you upon request. Victor J. Evans & Co., 270-B Merlin Building, Washington 6, D. C.

INVENTORS:—SIX Monthly Installments pays preparation, filing, etc. United States Patent Application by my Washington, D. C., Registered Patent Attorney. Inventions sold, patented, unpatented. Have buyers waiting. Your's may fit one of 500 classifications. Details free. Charles R. Morton, Patent Broker, 11 West 42nd St., New York.

INVENTORS: AVOID Unnecessary Xpense. Write For Free Booklet Explaining How **Our Consulting and Advisory Service Can Assist You In Deriving Greatest Profit From** Inventing. Institute of American Inventors, Dept. 50-B, 1926-Eye St. N. W., Washington 6, D. C.

INVENTORS: YOU save up to 300% when dealing with your patent searcher direct. Complete search with patent copies $6.00. Reports mailed in 5 days. Invention protection forms free. Write Raymond L. Smith, Patent Searcher, 703-X Albee Building, Washington 5, D. C.

INVENTORS—YOUR commercially valuable invention, any kind, patented, unpatented, may have cash, royalty possibilities in today's markets. Write today. Explanatory booklet, disclosure form, references, free. Invention Reporter, 4A-11106 So. Longwood Drive, Chicago 43.

INVENTORS: WITHOUT obligation, write us for information as to what steps an inventor should take to secure a Patent. Randolph & Beavers, Registered Patent Attorneys, 341 Columbian Bldg., Washington 1, D. C.

MODELS MECHANICAL, electrical, architectural built to specification for patent and development studies from your blueprint, sketch or letter. Scale Models, Inc., 104 Penn Street, Brooklyn 11, N. Y.

A LIST of 100 Manufacturers used by an inventor who has invented over 80 new articles this year, also advice on unpatented inventions. Only $1.00. 6537 20th N. E., Seattle 5, Wash.

INVENTORS—HOBBYISTS Precision lathe work our specialty—models—special machines. Send sketch. Ideal Experimental Laboratory, Box 142, N. Hackensack, N. J.

INVENTOR'S GUIDE free on request. F. A. Lederman, Registered Patent Attorney, 154 Nassau St., New York 7, N. Y.

PATENTED, UNPATENTED inventions promoted. M. Joyce Humphries, 1424 Landtitle, Phila. 10, Penna.

CASH FOR practical ideas and inventions. Mr. Ball, FA-9441 Pleasant, Chicago.

MODELS & MODEL SUPPLIES

WIZZ ELECTRIC Motor: Assembles in a jiffy. Flashlight cell operates. Parts complete, plus illustrated instructions 35c Postpaid. Eltro Company, 171F, Deer Park, N. Y.

CATALOG. ELECTRIC trains, airplane models, model racing cars, 25c. Stamps acceptable. Garrett & Co., 6829 Snider Plaza, Dallas 5, Tex.

SPEEDY 1" MOTOR, runs atop flashlight cell! Parts, instructions 35c. Fonskov, 655-M Amboy, Perth Amboy, N. J.

BRASS GEARS and model supplies for the inventors. Send 10c for catalog. Pierce Model Works, Tinley Park, Ill.

BALSA WOOD Ideal for Modelers, Craftsmen, sample carving block 25c. List Free. Sanlader, Manitowoc, Wis.

BUILD MODEL ships, airplanes, railroads. Catalog 10c. Ideal, 23 West 18th Street, New York 11, N. Y.

MODEL TRAIN catalog, handsome, 25c stamps, coin. Garrett Co., 6829 Snider Plaza, Dallas 5, Tex.

BIG ILLUSTRATED Model engine catalog 10c. Active Products & Supply Co., 53 W. Jackson, Chicago 4.

MODEL ENGINES

BUILD MODEL gas and steam engines using our "No Casting" plans. Very fast. Only lathe and scrap required. Catalog 10 Cents. B. Rowe Engineering, 8889 Appoline, Detroit 27, Mich.

PATENT ATTORNEYS

INVENTORS: LEARN how to protect your invention. The patent laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. The United States Patent Office advises the inventor to engage a competent, registered patent attorney to represent him. We offer inventors experienced, conscientious counsel and prompt, confidential service. A specially prepared booklet containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 73B-B District National Building, Washington, D. C.

INVENTORS—PATENT Laws encourage the development of inventions. The Rules of Practice of the U. S. Patent Office advises—unless an inventor is familiar with such matters—that he employ a competent registered attorney, as the value of patents depends largely upon the skillful preparation of the specifications and claims. Write for further particulars as to patent protection and procedure and "Invention Record" form at once. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 138-D Victor Building, Washington 1, D. C.

PATENT PROTECTION—The U. S. Patent Office recommends—"an applicant is advised, unless familiar with such matters, to employ a competent registered Patent Attorney . . . " as the value of patents depends largely upon the skillful preparation of the specifications and claims. Preliminary steps to take to obtain patent protection will be sent upon request. Victor J. Evans & Co., 271-B Merlin Building, Washington 6, D. C.

THE INVENTOR who believes he has a new and useful invention, and needs advice, should consult a competent registered patent attorney. Without obligation, write for full information on how to secure Patents and Trademarks. Randolph & Beavers, Registered Patent Attorneys, 763 Columbian Bldg., Washington 1, D. C.

C. A. SNOW & Co., 1-427 Snow Bldg., Washington 1, D. C. Registered patent attorneys. Established 1875. Literature mailed on request.

INVENTOR'S GUIDE free on request. Frank Lederman, Registered Patent Attorney, 154 Nassau St., New York 7, N. Y.

PATENT, TRADE-MARK searches. John B. Dickman, 533 Bond Building, Washington, D. C.

PATENTS

INVENTORS: TEST the Commercial value of your patented or unpatented inventions, quickly and inexpensively. Write for free information. Institute of American Inventors, Dept. 50-A, 1926 Eye St., N. W., Washington 6, D. C.

CAPITALIZE INVENTIONS without patent expense. Patents guarantee no Protection. Send $1.00 for booklet. "The Patent Racket," and profit thereby! Ryan Valve Co., Box 142, Easthampton, Mass.

INVENTIONS PROMOTED. Patented or Unpatented. Write Adam Fisher Company, 582 Enright, St. Louis, Mo.

PATENTS FOR SALE

INVENTORS—YOUR patented, unpatented invention, if practical, may have specific cash, royalty value in correct markets. Find out now. Explanatory booklet free. Invention Reporter, 4D-11106 So. Longwood Drive, Chicago 43.

INVENTIONS WANTED

INVENTORS: HUNDREDS of manufacturers have requested our assistance in locating marketable new products. Complete information, free. Institute of American Inventors, Dept. 50-C, 1926-Eye St., N. W. Washington 6, D. C.

WANTED—PATENTED, unpatented inventions having profit possibilities, all kinds. If will sell, reply immediately. Descriptive booklet, references free. Invention Reporter, 4B, 11106 So. Longwood Drive, Chicago 43.

INVENTORS! SELL direct to manufacturers. Send $1.00 for list of 212 manufacturers buying new products. Invention Market Research, 342-MI, Madison Ave., New York 17.

WANTED; PRACTICAL inventions of all kinds by manufacturers. Patented or Unpatented. John D. & Son, 285 Howard Ave., Box 3213, MI-2, Bridgeport 5, Conn.

EARN UP to $2,000 year, inventing simple items for special cash markets. Ideas only. No patents. Hendrickson, Argyle (9-A), Wis.

INVENTIONS PROMOTED. Patented or unpatented. Write Adam Fisher Company, 582 Enright, St. Louis, Mo.

CASH FOR inventions—Patented, unpatented. Mr. Ball, FB-9441 Pleasant, Chicago.

AIR CONDITIONING & REFRIGERATION

BLOWERS, GAS conversions, and floor furnaces. Postcard for literature. Peerless Sales, Lincoln 6, Nebr.

BLUEPRINTS & PLANS

BUILD REAL heavy duty machines, using our production tested plans. 30" bandsaw, 12" lathe, dowel machine, portable sawmill, planer, concrete block machines. Dozens other machines for shop, farm, home. Free lists. Nichols Equipment Co., Purvis, Miss.

MODERN KITCHEN cupboard construction and planning made easy with our plans. Free information. Masterprint Company, White Building, Buffalo, N. Y.

BUILD MOTOR Scooters, Garden Tractors. Blueprints $3.00 each, also Kits. Carl Odam, Box 1066, Lubbock, Tex.

BOATS, OUTBOARD MOTORS

PLYWOOD BOAT KITS! Complete materials for building "Deltacraft," "Junior Dinghy," "Tadpole Skiff." Mahogany marine plywood and oak construction! Send 10c today for illustrated folder featuring these Boat Kits and other marine materials and supplies. Carmen-Bronson, Marine Department, Mount Vernon, N. Y.

FULL SIZE cut to shape patterns, blueprints. $3.75 up. Pleasure boats, to 38 feet. Illustrated "Build A Boat" catalog, 10c. "How to Build Boats" book, $1.00. Cleveland Boat Blueprint Co., Dept. A23, Cleveland 13, Ohio.

MARINE POWER—Easily convert any Ford and Jeep motor (domestic and foreign) with Osco parts and kits. Complete catalogue 25c (coin). Osco Motors Corp., 2020D E. Orleans St., Philadelphia 34, Penna.

HIGH SPEED outboard motor tuning and Souping Up methods. Instructions $1.25. Excello Marine Sales, Post Office Box 71, Stratford, Conn.

COMPLETE PLANS, specifications. Easily built row boat by designer, $1.00 cash. K. R. Maloon, 82 Webster St., Laconia, N. H.

MARINE CONVERSIONS for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Company, Department C, Newark 2, N. J.

INBOARD MARINE motors, conversions, supplies. Catalog on Request. Stokes Marine Supply, Coldwater, Mich.

BUILD-IT-YOURSELF

BUILD YOUR home as a hobby. No rent. No mortgage. Save 50%. Use spare time. No special skill required. Amazing facts sent free. Harold C. Lightfoot, Civil Engineer, Richboro, Penna.

FOR PROFIT or Fun! "Eazimade" plans, inventions, formulas—Automotive, Farm, Shop, Plastics, Moneymaking specialties, Home businesses, inexpensive "fast freezers," Arc-welders, motor scooters, "midget" cars, plating outfits, outboards, motorized equipment, etc. Valuable Catalogue (Refund Coupon)—Dime! Almquist Engineering(X), 447 64 Street, Brooklyn 20.

BUILD CONCRETE block machine. Vibration and hand operated types. 100 blocks per hour. Easy, inexpensive. Sell blocks, build home, garage, barn at low cost. Details Free. W. Horne, 206 West Wilder, Tampa, Fla.

HOT WATER Free—from sunlight. System efficient any locality year 'round. Standard materials—easily built—low cost. Facts Free. Solar Water Co., Box 175, Dept. C, Coral Gables, Fla.

BUILD CONCRETE block machine. New principle. Easy. Inexpensive. Sturdy. Serviceable. Motor vibrator or hand. Free details. Clyde Lee, Mountain View 9, Okla.

LATHE—HUSKY, rigid. Mostly junk material. Plan $1. Motor Rotation direction control. Instructions and fittings $1. G. Marvin, Emmett, Idaho.

BUILD 4-ROOM House with bath for $600. Modern Styling. Send for Free Picture and Floor Plan. T. Wolverton, 1245 Florence Drive, Blacklick, Ohio.

CONCRETE BLOCK Homes 24 page booklet; drawings and instructions how to build. $1.00. Harold C. Lightfoot, Civil Engineer, Richboro, Penna.

BUILD CONCRETE Mixer. Power driven, simple, inexpensive. Details Free. W. Horne, 206 West Wilder, Tampa, Fla.

FOR SPORTSMEN

REG. AMERICAN Water Spaniels, excellent hunters. Also Champion King of Dixie at Stud. Elmer Plarr, Parker Rd., Hamburg, N. Y.

FINEST GLASS Eyes; Taxidermy Supplies. Catalog Free. Elwood Company, Department 236, Omaha 2, Nebr.

HOME CRAFTSMEN

CATALOG: PATTERNS plywood Novelty Furniture — Letters — Numerals — Plaques— Frames — Weathervanes — Silhouettes — Lawn Ornaments. 100 Books & Booklets on Crafts & Hobbies, Picture Frame Mouldings, Tools, Large line Decal Transfers. Other lines. Hundreds articles finely illustrated. Write Wo-Met Shop, Ashburn, Ga.

28 LAWN ORNAMENT patterns 25c. Other patterns: 15"-20" high; Dutch girl; Dutch boy, pirate, bull terrier, Mexican girl, Mexican boy, dwarf, penguin, flower girl, 10c each; 3 for 25c. 25 novelty patterns 30c. All 62 full size patterns $1.00 postpaid. Strother, Box 383-MA, Bellington, W. Va.

MAKE SHELL Jewelry—for gifts, as a hobby or start a business. Free catalogue and price list. Complete illustrated book of instructions 75c. Florida Shellcraft Company, Box 1840, Sarasota, Fla.

WALLPAPER REMOVING simplified. Layers lift off quickly after using a Mistic remover. Handiest aid ever devised. Guaranteed. Postpaid $1.00. Mistic Co., Cincinnati (19), Ohio.

SHELLCRAFTERS! A wide selection of Seashells, Jewelry Findings, Plastic Discs. Wholesale only. Free Catalog. Beachcomber Novelty Co., Box 551, Fort Myers, Fla.

JIG SAW patterns. Full size, ready to use. Artistic Gothic wall shelf 20" high; corner shelf 17". Both for 10c. Jig Saw Guild, 117-JL Worth Street, New York 13.

EXPERIMENTERS! INTERESTED in Electrical, Mechanical devices from War Surplus? List free. F. Siefke, Box 18, Station E, Buffalo, N. Y.

MAKE MONEY assembling our pre-fabricated plastic kits. Sample kit 50c. Catalog free. Fabros, Box 156, Station F-4, Buffalo 12, N. Y.

LEATHERCRAFTERS! SEND for free catalog listing leather, kits, supplies. Kit Kraft, 1607 So. Western, Los Angeles 6, Calif.

LEATHER CRAFTERS. Supplies, patterns, and designs, 75c—$1.25. Kruces Kreative Kraft, Box 42, Las Cruces, N. M.

SPECIAL OFFER: 70 full size toy, novelty, and lawn ornament patterns only $1.00. Lists 5c. Lynds, Medway, Mass.

REPLACEMENTS, GRATES, firepots, linings, fireplastic wringer rolls. Magprodax, Royal Oak, Mich.

HAND-MADE NOVELTIES

WESTERN MINIATURE Leather saddles $4.95, ten dram hats, 59c. Krueces Kreative Kraft, Box 42, Las Cruces, N. M.

WHITTLER'S SUPPLIES—readi-cut blanks, special woods, knives. "Old" Whittler, 1402 Charles, La Crosse, Wis.

PLASTICS

PLASTICS, ACCESSORIES from "one-stop" store. Plexiglas, Lucite, Cellulose Acetate for hobbies, money-making opportunities, sheets, rods, tubes, clear or colored. Full range of sizes. Cements, dyes, polishing compounds, buffs. Send for free price list, also details Burgess Vibro-Tool, Handee Moto-Tool, Plasticor Injection Molding Machine, molds novelties, toys, gifts. Plastic Parts & Sales, 1157 S. Kingshighway, Dept. H-3, St. Louis 10, Mo.

RUBERLYKE PLASTIC Foneholder, New, Novel, Fast Selling, Retail, 60c. Fair-Traded. Everybody a prospect. You also sell retail outlets. Fits all phones. Telephone rests on shoulder. Leaves hands free. Sample 50c. Reyam Plastic Co., Dept. M-2, 1525 East 53rd St., Chicago, Ill.

PLASTICS! 1947 ILLUSTRATED catalog lists all materials at new low prices. Full instruction, moneymaking ideas. Information about National Cash Prize Contest. Send 10c today to Bellco Plastics, Inc., Dept. M-1, 147 W. Sidney Ave., Mt. Veron, N. Y.

NEW LIQUID plastic. Clear, colors. Cast without heat. Embed flowers, insects, coins. Saw, drill, carve. Manual tells how. Send $2.95 plus 20c postage for complete kit including one pound liquid Castolite. Dept. B22, Castolite, 211, Kenilworth, Ill.

PLASTICS: PLEXIGLAS sheets, dyes, glues, everything for hobby workers, beginners kits $1.65 up. Manuals 50c. Catalog stamp. Plastic Products, Box 1415, Salt Lake City 11.

PLASTICS—MAKE yours at home. Formula and moulding instructions $1.00. Foster, Box 84, Station K, Toronto, Canada.

PLASTIC CUT-OFFS (Odds-Ends), $1.25 pound, Postpaid. Factory, 2404N15, Philadelphia.

SPORTING GOODS, FISHING TACKLE, GUNS

FISHING POLES: Native Canes, Bamboos, Calcuttas, Tonkins. Baseball Bats, Softball Bats, Boys' Bats. Sample 3-piece Native Cane Prepaid $2.50. Dealers only. Bob Pace, Combs, Ark.

8M/M MAUSER Custom Ammunition. Play safe next hunting season. Send for Order Blank. Ratliff, Hillyard, Wash.

3000 BARGAINS, FIREARMS, Binoculars, War Relics. Catalog 30c. Smith Armory, Runnemede, N. J.

FIELDGLASSES, TELESCOPES, MICROSCOPES, ETC.

REFLECTING TELESCOPES, complete 3½" diameter, equatorially mounted. View planets, stars. $19.75. Write Skyscope Company, 475-M 5th Ave., New York.

60 POWER TELESCOPE, $2.95. 250 power microscopes, $2.45. Send for free catalog of Telescopes, Binoculars and Microscopes. Brownscope Company, 24 West 45th Street, New York.

BIRDS, SMALL ANIMALS, OTHER PETS

MONEY RAISING rabbits. Investigate folder 10c. Close's Rabbitry, Tiffin 1, Ohio.

BEAUTIFUL, USEFUL collie-shepherd pups $12. Paul Schultetus, New Liberty, Ill.

DAIRY GOATS

MONEY FROM dairy goats! Booklet free. Introductory 3-month subscription to leading magazine 25c. Dairy Goat Journal, Dept. 717, Columbia, Mo.

HORSE TRAINING

"HOW TO Break and Train Horses"—A book every farmer and horseman should have. It is free; no obligation. Simply address Beery School of Horsemanship, Dept. 1152-C, Pleasant Hill, Ohio.

RABBITS

GUARANTEED CHIN-CHIN Giant Chinchilla rabbits. Greatest amount of delicious meat. Largest, finest, most valuable furs. Tremendous demand for breeding stock. We buy youngsters. Contact world's largest breeder. Willow Brook Farm, R38, Sellersville, Penna.

ANGORAS, CHINCHILLAS, White Giant Rabbits—"Rabbitry Management" tells everything. $1.00. Self-cleaning Hutch plans $1.00. Automatic Feeder plans $1.00. All three $2.50. Catalog finest Pedigreed Rabbits free! Grinsteads, Dept. 31-D, Edwardsville, Ill.

RAISE MONEYMAKING Angora Rabbits. Wool, $15.00 pound. Plenty markets. Cash income. Future prospects bright. Particulars free. White's Rabbitry, Lawrence, Kan.

ANGORA RABBIT wool spinners, shearing tables, breeding stock. House of Angora, Dept. A-I, Springfield, Ill.

RAISE GUINEA Pigs. Make money at home. Big demand. Free Booklet. Taylor, Box 426E, Hapeville, Ga.

REAL ESTATE, FARM LANDS

FLORIDA HIGHLANDS $100. 2 acre beautiful fertile farm $7 monthly (half oil rights), 200 feet above sea level, 40 miles north of booming Pensacola. Delker (Owner), 2219 Venango, Philadelphia (40), Penna.

OZARK FARMS. 5 to 5,000 acres. Reasonable prices. Descriptives free. Frank Farm Agency, Dept. 20, Mountain View, Mo.

OZARKIAN, 111. EUREKA Springs, Ark. Magazine for homeseekers. Year $1.00.

TREES, SHRUBS, FLOWERS

LEARN NURSERY Business. Fine, profitable occupation. Richland Gardens, Martin, Tenn.

PERSONAL

BORROW BY Mail! Loans $50.00 to $1,000.00 to employed men and women. Easy, quick. Completely private, confidential. No endorsers. Repay in convenient monthly payments. Details Free in plain envelope. Write First Loan Co., World Herald Bldg., Dept. G-16, Omaha, Neb.

BEAR OIL—Best treatment for baldness. You never saw a bald headed Indian. They use it. We can supply you with the genuine product. One dollar prepaid. Swastika Drug Co. Limited, Swastika, Ontario.

MAIL FROM beautiful Puerto Rico, letters 25c each; native postcards 3 for 25c; miniature pictorials, set 45c; souvenir book 35c. Remailed. Enterprises, Box 654, San Juan, Puerto Rico.

ATOMIC WEIGHTGAINING—New Streamlined Method. Gain six pounds a week. No diet or apparatus necessary, also reducing. Send $2.00. Box 123, Leonard Green, Norwalk, Ohio.

VISIT PANAMA Canal By Proxy—I send 3 scenic cards, 50c, you address and return, also remail letters 25c. Herman Spitler, Fort Amador, Box 202, Balboa, Canalzone.

UNHAPPY? WANT different job? Unemployed? We can help you! Write fully. No obligation. Personal Service, 3070-B Hull Avenue, New York 67, N. Y.

LETTERS, POSTCARDS forwarded, 25c each. Beautiful California souvenirs, 25c—50c. Renfro, 2533 University, San Diego, Calif.

LETTERS REMAILED from Beautiful Hawaii, 25 cents coin. Robert Stonewell, 634 Waiakamilo Rd., Honolulu 35, Hawaii.

LOVELAND POSTMARKED letters remailed. 10c plus postage. Sweetheart Letter Service, Loveland, Ohio.

STOP SMOKING. Drinking. Guaranteed treatments. $2.00 each. Laboratory, 364C Evans, Aurora, Ill.

JEWELRY

CUSTOM MADE Jewelry. Enormous profits, part or full time business. Copyrighted laboratory manual teaches step by step—buying, cleaning, alloying precious metals. Designing, pattern making, casting, by proven methods, using simple home made equipment. $1.00, refundable in seven days if not satisfied. Hobby Craft Research Bureau, Builtrite Building, 3813 East Florence Ave., Bell, Calif.

JEWELRY, FINDINGS. Dime brings latest catalog. George Sassen, 154 Nassau Street, New York 7.

MINERALS—PRECIOUS STONES

FIFTY MINERAL Specimens in box, mounted, identified, described, postpaid $4.00. Old Prospector, A23, Dutch Flat, Calif.

"GENUINE" ARIZONA Rubies (Garnets). Send quarter for packet. Mineral Specimens Company, Box 2651, Phoenix, Ariz.

GENEROUS SAMPLE Placer Gold. $1.00 postpaid. Box 83, Elk City, Idaho.

RAZORS, BLADES, ACCESSORIES

SINGLE OR Double Edge Blades, $1.35 per 100; Durham (type), $3.75 per 100; Auto-Strop (type), $3.25 per 100. Postpaid Prices. Nadco Dist., Box 2450, E. Cleveland 12, Ohio.

TWO HUNDRED Shaves on One Blade. Single or double edge. With this decorative shaving brush and soap holder. $1.00 Postpaid. Harvey's, 19 Carroll, Naugatuck, Conn.

25 TO 100 SHAVES from one blade with Goodrich Blade Sharpener. 35c Coin. No stamps. G. R. Sales, 314 Short St., Danville, Va.

TOBACCO, PIPES, ETC.

PIPE SMOKERS Valet. Pipe smokers what you've been waiting for. The Traveler's Pipe Valet; Beautiful Lucite rack, holding two pipes, tobacco, matches. Fits on dashboard of car, plane, or cruiser with guaranteed rubber suction cups. Enables you to fill and light pipe with one hand. Write for free descriptive booklet. Dealers and Jobbers protected. Jalouise Art Co., Dept. B, 173 Hobart St., Ridgefield Park, N. J.

CIGARS, GENUINE Handmade, 100, Choicest Quality, $5.95 Postpaid, Check, Money Order or Cash. S. & E. Co., Dept. MI, Red Lion, Penna.

WATCHES, WATCHMAKING, ETC.

WATCH AND clock repairing easily learned by our home study course. Write for free information. Houston Chronometer & Watch Co., Box 1140C, Houston 12, Tex.

WATCH AND Clock Repairing—complete practical course in modern horology. 66 illustrated self-instruction lessons. Just out! Low price. Fascinating 100-page illustrated catalog Free! Write—Nelson Company, Dept. 3-03, Chicago 5.

OLD GOLD WANTED

OLD GOLD in any form: highest price. Mail old or broken jewelry, rings, watches, gold teeth. Receive cash by return mail. 100% satisfaction or your articles returned. The Old Gold Specialist, Robert Wyndham, 1035 East A. Street, Ontario 4, Calif.

WANTED—OLD, broken jewelry. Cash paid immediately. Mail gold teeth, watches, rings, silverware, diamonds, spectacles. Satisfaction guaranteed. Information free. Rose Smelting Co., 29-K East Madison St., Chicago.

MISCELLANEOUS

GOOD "USED" self-instruction educational books on all subjects bought, sold, rented, exchanged. Satisfaction guaranteed. Complete information and 100-page illustrated bargain catalog Free! Write—Nelson Company, Chicago 5.

MEDICAL LABORATORY Technicians in great demand. We train you in your own home, in your spare time. Bulletin free. Imperial Technical Institute, Box 973-Y, Austin 5, Tex.

RECEIVE MONEYMAKING opportunities, mails, samples, catalogs, magazines. Your name inserted in thousand mailing lists, 25c. Glassmine, 1654-BM Amsterdam Avenue, New York 31.

ELIMINATE ASH dust:—This inexpensive device is simple to install in your basement. Complete plans $1.00. J. Gagnon, 1174 Kingsway, Vancouver, Canada.

LOCK PICKING—Open pin tumbler, wafer locks; automobiles, vending machines, etc. $1.00. National, 322"A" Union Avenue, Brooklyn 11, N. Y.

HOW TO Read Character at a Glance, by Von Waggoner, Illustrated, One Dollar Prepaid. Address Had Rood, 3 So. Pleasant, Norwalk, Ohio.

TRANSFER COLOR printed pictures onto Cloth, Paper, or Glass. Simple instructions only 25c. Malcolm, 3701 Eastern Ave., Baltimore 24, Md.

GIGANTIC MAILS, magazines, catalogs, listing 10c, three times 25c. Waddell's Directory, 341-D East 76th Street, New York 21.

RECEIVE MAILS, literature, opportunities. Your name in numerous mailing lists 10c. Robert Greenwood, 275 Broadway, New York.

BURIED TREASURE. Minerals, free booklet, photographs. Fisher Laboratory, Inc., Palo Alto, Calif.

MAKE YOUR Own Plastoplate printing cuts. Simple, easy process. Plastoservice, Argyle (3), Wis.

"MAGICBAR" MAGNETS, 4, plus 100 experiments, $2.00. Eljay-1, Box 891, Newark 1, N. J.

SQUARE DANCE Instructions, 25 sets, $1.00. Reyburn, Eureka Springs, Ark.

WANTED—MISCELLANEOUS

DO YOU want to Swap, Buy or Sell anything? Get The National Swappers Guide. It contains hundreds of Swappers, Buyers and Sellers from coast to coast who list thousands of items they want to Swap, Buy and Sell. Send $1.00 and we'll mail you this valuable Guide postpaid and list what you want to Swap, Buy or Sell in the next issue absolutely Free. National Swapper's Guide, P. O. Box 413, Evansville, Ind.

BEVERAGE CUP vendors, used. R. McFarlane, Balboa Park, Ocean & Phelan, Bldg. 7, San Francisco, Calif.

MERCURY—HIGHEST prices. Free containers. Write, Mercury Company, Norwood, Mass.

PAINT & PAINTING SUPPLIES

LUMINOUS PAINT shines at night. Bottle 25c. H. Sibley, R.F.D. Box 81-A, Milford, Mass.

NEW AUTOMOBILE ENGINE MANUAL

JUST OFF THE PRESS

Drake's Automobile Manual helps you keep your own car running smoothly or qualifies you to earn big money as an automobile engine expert. 300 pages of sound information and instruction. Over 200 illustrations. Teaches you how to service all types of auto engines. Covers ignition, carburetion, etc. Order today. *No. 1* on coupon.

ALSO—note these other big value books:

No. 2—Drake's CYCLOPEDIA OF RADIO and ELECTRONICS—NEW 12th Edition. 764 pages. 1400 headings. 90 illust. Only $6.00.

No. 3—HOUSE WIRING MADE EASY. 96 pages. Over 100 illust. Only $1.50.

No. 4—Drake's REFRIGERATION SERVICE MANUAL. 317 pages. 148 illust. Only $2.00.

No. 5—Drake's HEATING, COOLING, and AIR CONDITIONING HANDBOOK. 700 pages. 64 tables and charts. 350 illust. Only $4.00.

DRAKE BOOKS ARE SOLD BY LEADING BOOKSELLERS

USE THE COUPON — MAIL TODAY

Fred'k J. Drake & Co., Dept. D-2, 600 W. Van Buren St., Chicago 7, Ill.
Please send me the books checked below. If not satisfied I will return them in 5 days and my money will be refunded.

1 2 3 4 5 (Circle numbers wanted)

☐ Check or money order enclosed $..... Send books postpaid.
☐ Send C.O.D. plus postage.

Name.....

Address.....

City.....State.....

BE READY FOR A BETTER JOB AT BIGGER PAY

Thousands of Trained Men Will Be Needed

● The building boom is well under way. New homes and other structures to be built will provide a tremendous number of well-paid jobs. Men trained in Architecture, Drafting, Contracting, Carpentry and related building trades will cash in BIG on their knowledge and skill. YOU can train in spare time at home, at low cost, for a big-pay job in this rich field. American School can help you to success just as it has helped others during its 50 years. Check, fill in and mail coupon NOW for FREE information.

AMERICAN SCHOOL, Dept. B228, Drexel Ave. at 58th St., Chicago 37, Ill.
Send me FREE information about your special training plan covering subjects checked below.

☐ Architecture and Building
☐ Drafting and Design
☐ Contracting
☐ Practical Plumbing
☐ Air Conditioning
☐ Refrigeration
☐ Electrical Engineering
☐ Automotive Engineering
☐ Diesel Engineering
☐ Mechanical Engineering
☐ Plastics Engineering
☐ Aviation ☐ Radio
☐ Business Management
☐ High School Courses

Name _____

Address _____

U.S. Army RADIO PHONES (WATER, SHOCK and WEATHER PROOF)

Made to U.S. Army Specifications, passed by Signal Corps Inspectors. Dynamic Microphone and Dynamic Receiver of Finest Quality—Water, Shock, Weather and Altitude Proof, used on tank and aircraft (B19) intercom systems. For recording, for battery-less telephone, talk through your radio set or use earphones for pocket-size set loud speaker. Complete two receiver, cord set, head band, and dynamic hand microphone including special connecting cord set. A REAL BARGAIN AT THIS PRICE.

ONLY $9.95 Postpaid
ORDER YOURS TODAY

Here It Is: ELECTRIC SWITCH of a Thousand Uses

VERSATILE SWITCH MILLIONS IN POST WAR APPLICATIONS—Floodlight your porch when the door is opened—Sounds alarm when window is opened—Signals arrival of mail—Controls heating of furnace—Filling of water tank, these and many other services are performed by this versatile switch. Shipped with instruction sheet showing numerous illustrated uses. EXCEPTIONAL LOW PRICE.

ONLY $1.00 Postpaid

KING PRODUCTS CO., Dept. MI-3, Batavia, Ill.

MACHINE SHOP EQUIPMENT

Just off the press!—Every man who owns a workshop should have a copy of our new, up-to-the-minute, 200 page catalog of Machine Shop Equipment—the latest tools made by the biggest manufacturers in the U. S. Replete with illustrations, descriptions, prices. Prompt delivery on most tools listed in this book. Available at cost of printing—50c a copy—get yours today! Price of Catalog Refunded on First Order over $5.00. Send Check or Money Order to

CENTER TOOL CO.
157 Centre St. New York 13, N. Y.

ONE-MAN SAWMILL LESS THAN $200.00

Easy To Turn Trees Into Money

MAKES LUMBER—ties, shingles, crates, laths, studding, siding.

BELSAW MODELS in 10 to 24 foot sawing lengths. MECHANICAL FEED, accurate set works and positive dogs. Use tractor or old auto engine for low cost power. Thousands used for commercial sawing. Pays for itself quickly. Send post card today for FREE booklet "How To Make Lumber" and Catalog of Woodworking Equipment.
BELSAW MACHINERY COMPANY, 1834K Field Bldg. 315 Westport Rd., Kansas City 2, Mo.

WRITE for FREE EVINRUDE CATALOG

Completely describes 1947 line of Evinrude outboard motors—light "singles", smooth "twins" and 3 thrilling four-cylinder models. Gives helpful information on boats, speeds, etc. Profusely illustrated. Address, EVINRUDE MOTORS, 5406 N. 27th St., Milwaukee 9, Wis.

EVINRUDE

WOODWORKERS ... Get this CONSTANTINE MASTER MANUAL

Get the Most Fun From Your Hobby
Indispensable to woodworkers. Newest, biggest edition, more pages, more color, helpful how-to-do-it articles, pre-war and new items, more bargains. Send 25c today and we will include **FREE! FULL YRS. SUBSCRIPTION** to Chips and Chats, published bi-monthly. Keeps you up-to-date on everything in woodworking, offers big money-saving bargains. Send now.

ALBERT CONSTANTINE & SON, Inc.
794-8 135th Street, New York 54, N. Y.

YOU CAN GET THIS 2 H.P. MOTOR SCOOTER

AS LOW AS $29.95

Assemble or build it—it's easy! We can furnish factory built parts. 2 speeds up to 45 MPH! 100 M.P. gal. Easy riding—knee action and low gravity spring frame. Large 12" tires. Ultra Streamlined!

Send Only $1.00 (Cash or money order postpaid, or pay postman $1.52 C.O.D. in U. S. only.) For complete scale isometric picture blueprints (anyone can read them), 8 pages photo details, lists of factory parts and prices for both the electric and gas models!

FREE with each order—big 48 page color book giving full details on over 100 other new inventions such as Jet Engines—Midget Motorcycles—Electric Welders—Motors — Midget Cars — Bike Motors and Sidecars—Midget Garden Tractors. Don't pass up this super value—you may earn and save hundreds of dollars with these plans! (All foreign orders $1.50 U.S. currency with order)

MOTOR INDUSTRIES INC., Dept. M12, KEARNEY, NEBRASKA

THE RIGHT LATHE FOR SMALL SHOPS

Compactly designed to occupy minimum floor or bench space, the Logan Lathe handles a wide variety of operations. The ball bearing mounted spindle requires no adjustment from 30 to 1450 rpm and permits use of high speed carbide cutting tools. Conveniently located levers and hand wheels enable the operator to work in safety and comfort and without fatigue. Rugged construction throughout, and self lubricating bronze bearings at vital points insure lasting accuracy and low maintenance. WRITE FOR THE LOGAN CATALOG . . . illustrated descriptions of all Logan Lathes, Shapers, and Accessories.

LOGAN ENGINEERING CO.
Dept. E-2, 4901 W. Lawrence Ave., Chicago 30, Ill.

ELECTROPLATING OUTFIT

BRUSH-ON SILVER, COPPER

Only $3.95 COMPLETE

Comes Ready to Use—Nothing Else to Buy!

Here's the Handy ELECTRO-PLATER outfit for your home-workshop or business! Only $3.95 complete! Puts a smooth, shining, silver or copper plating on silverware, toys, models, doorknobs, auto accessories, home fixtures . . . everything with a conductive surface! Simple, easy to use! Complete instructions furnished. Just brush on silver or copper plating! Comes complete—ready to use—with liberal jars of silver and copper plating materials, cleaner, two brushes, battery power unit . . . everything you need to start plating at once! Nothing else to buy.

SEND NO MONEY! GUARANTEED!

Just mail name and address today! Pay postman only $3.95 plus few cents postage on delivery. Use electroplater for 10 days. If you are not completely satisfied, return outfit and your money will be refunded. Rush your order today!

HANDY ELECTRO-PLATER • Dept. A-115
239 Strader Avenue Cincinnati 26, Ohio

An Invitation To Readers of This Magazine

FROM THE PUBLISHERS OF THE

FUNK & WAGNALLS *New Standard* ENCYCLOPEDIA

Please Accept WITH OUR COMPLIMENTS

Volume One of the New 1947 Edition—Now On Press!

[ALL WE ASK YOU TO PAY IS TEN CENTS TO COVER COST OF MAILING IT TO YOU]

WE are now on press with our new Winter 1947 Edition of the Funk & Wagnalls New Standard Encyclopedia.

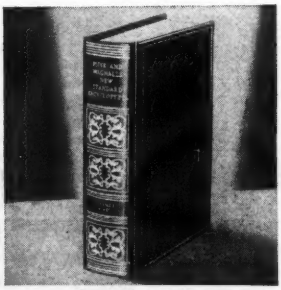
This latest edition, newly revised, we have allocated among the newspapers and magazines carrying our Winter advertising program. In accordance with this plan we have set aside 1500 sets for readers of this magazine and now invite you to become the owner of a set—making this extraordinary offer to enable you to become acquainted with the volumes before you decide to buy.

We want to send you Volume I with our compliments. Merely send us 10c to cover our mailing cost — more as evidence of your good faith than anything else. If, after examining Volume I, you want the rest of the 27-volume set, you may receive it at a ridiculously low price through our book-a-week plan. If you want no further books, merely drop us a postcard saying so, and that ends the matter.

Some Facts About This Encyclopedia

But first, we want to give you a few facts to interest you in taking the trouble to send for Volume I.

The newest 1947 Edition contains over 52,000 articles. Compare this with any other encyclopedia in the world. You will find that it is at least 30% more than encyclopedias costing you up to four times as much as ours.



Copyright 1947, Unicorn Press

Each volume is as up-to-date as human ingenuity can make it. This edition has been revised to cover events of the past year, and each volume, as it goes to press, is brought up-to-the-minute. Our unique book-a-week delivery plan, bringing you the volumes as they come off the presses, makes it the most up-to-date of encyclopedias.

Easy-Reading, Handy Volumes

Editor-in-Chief of original edition was Frank H. Vizetelly, editor of the Funk & Wagnalls New Standard Dictionary. Surrounded by a host of authorities, he brought this immense work into being.

Yet the books are so easy to read! Your children in school can use them with profit. Free of abstruse wording—and free also of fact-omitting brevity—this grand encyclopedia will serve you for years to come.

And in spite of their enormous contents, each volume can be held in one hand! Here is a new streamlined, usable set, handy for daily reference.

Nor does the incredibly low price we have set on the remaining volumes indicate the quality of materials and labor that went into them, as of course you will soon see for yourself.

Unique Book-a-Week Plan

Our plan gives you the books as quickly as they come off the presses.

Volume I is delivered to you immediately. Two weeks later, unless you cancel your reservation, the next two volumes are mailed to you. Two weeks after that the following two volumes are sent, and so on. You thus receive your volumes, freshly off the press, at the rate of a volume a week.

You do not pay for any books in advance. We enclose a bill with each two volumes which you pay within 5 days after receiving the books. Considering the amazingly low price of the set and the fact that you pay for it at the rate of only a book a week, our pay-as-you-go plan therefore puts no strain on any pocketbook.

How much are the volumes? Here's the surprise. *You pay only $1.39 for the De Luxe Binding, plus 11¢* mailing cost. The complete set thus costs you only a small fraction of what other high grade encyclopedias would cost you—and we want only the opportunity to *PROVE* to you that ours is unexcelled for your use.

A Choice of Editions

With this announcement we offer you a choice between our De Luxe Edition and our Library Edition of the encyclopedia.

The De Luxe Edition, at $1.39 per volume, is bound in dark blue, leather-grained cloth, stamped in red and gilt, as illustrated here, with head and tail-bands, and harmoniously stained page-tops. End papers and frontispieces are color reproductions of woodcuts by Hans Alexander Mueller, renowned artist in that medium, the frontispieces being a set of woodcut portraits of American Presidents.

The Library Edition costs slightly more ($1.89 per volume plus the same 11¢ mailing cost), and has all the features described above, plus a more expensive binding. The covers of this superfine edition are in a tan linen-weave cloth, with red and black title panels, decorated with genuine 22 carat gold leaf, bright and untarnishing—making in all an extremely handsome and dignified set of books.

You may have your choice of these editions in sending for Volume One, at the same 10¢ mailing cost. However, before indicating your choice of editions in the coupon at left, please remember, the difference in price. And *hurry!* Fifteen hundred sets are not many for a magazine of such large circulation as this one. First come, first served. Send off the coupon TODAY!

UNICORN PRESS, *Authorized Publishers*
Brooklyn 1, New York

I enclose 10¢ in coin or stamps, for which send me Volume I of the Winter 1947 Funk & Wagnalls New Standard Encyclopedia in edition checked below.

☐ DE LUXE ☐ LIBRARY

Please also reserve balance of a set for me in same edition.

If I decide to cancel reservation after examining Volume I, I will write you saying so, and there will be no further obligation; otherwise you may send me two more volumes every two weeks, and I will pay within 5 days after receiving them, at the rate of $1.39 per volume plus 11¢ mailing cost for De Luxe Edition (or $1.89 per volume plus same mailing cost for Library Edition)—and that is all! *Volume I is mine to keep in any event.*

Name .....

Address .....

City, Zone, State.....1187

AUDELS REFRIGERATION & AIR CONDITIONING GUIDE.....$4

New from Cover to Cover—1280 Pages, Fully Illus. Covering basic principles, servicing, operation & repair of household, commercial & industrial refrigeration & air conditioning. A gold mine of essential important facts for engineers, servicemen, users.

AUDELS CARPENTERS & BUILDERS GUIDES—4 Vols. $6

A practical illustrated trade assistant on modern construction for carpenters, joiners, builders, mechanics and all woodworkers. 4 vols., 1600 pages, 3700 illustrations, flexible covers. Pocket size. Each volume sold separately $1.50 a vol.

AUDELS AUTOMOBILE GUIDE.....$4

A practical quick ready reference book for auto mechanics, service men, operators & owners. Explains theory, construction & servicing of modern motor cars, trucks, buses & auto type Diesel engines. 1510 pages, fully illustrated. 55 chapters. Indexed. A standard book for mechanics. New fluid drive covered.

AUDELS DIESEL ENGINE MANUAL.$2

A practical, concise treatise with questions and answers on the theory, operation and maintenance of modern diesel engines including General Motors 2 cycle Diesel. 384 pages, fully illus., flexible binding, pocket size. All details plainly brought out, this book is of extreme value to engineers, operators & students.

AUDELS WIRING DIAGRAMS.....$1

210 Pages. Illustrated. Gives practical facts on wiring of electrical apparatus. It shows clearly how to wire apparatus for practically all fields of electricity. Each diagram is complete & self-explanatory. Highly Endorsed Pocket Companion.

AUDELS PLUMBERS & STEAMFITTERS GUIDES—4 Vols. $6

A Practical Trade Assistant & Ready Reference. Explains in plain language & by clear illustrations, diagrams, charts, graphs, pictures principles of modern plumbing practice including Marine Pipe Fitting and Air Conditioning. 4 Vols.—1670 Pages—3642 Diagrams. Pocket size. Each Vol. Sold Separately $1.50 a Vol.

AUDELS SHEETMETAL WORKERS HANDY BOOK.....$1

Practical inside information. Fundamentals of Sheet Metal Work. 318 pages. Illustrated. 11 sections. Clearly written. Essential & important facts, figures, pointers in everyday language. Ref. Index.

AUDELS SHEETMETAL PATTERN LAYOUTS.....$4

Developed by Experts for Sheet Metal Workers, Layout Men & Mechanics. A Practical Encyclopedia in 10 Sections, size 7 x 10 x 2—1125 Pages—350 Layouts—1600 Illustrations, 1001 Key Facts. Fully indexed for ready reference in answering your layout problems. Covers all phases of sheet metal work including Pattern Cutting, Pattern Development & Shop Procedure.

AUDELS ANSWERS ON BLUE PRINT READING.....$2

For Mechanics & Builders. Covers all types of blue print reading including ship & airplane. 376 pages, fully illustrated.

AUDELS NEW MACHINIST & TOOLMAKERS HANDY BOOK....$4

Covers modern machine shop practice in all its branches. 5 practical books in 1. New from cover to cover. Tells how to set up & operate lathes, screw and milling machines, shapers, drill presses and all other machine tools. 1600 pages, fully illustrated, 5 x 6½ x 2. Indexed. 5 sections. 1—Modern Machine Shop Practice. 2—Blue Print Reading & How to Draw. 3—Calculations & Mathematics for Machinists. 4—Shop Physics. 5—How to Use the Slide Rule. 60 chapters. Easy to read and understand. A shop companion that answers your questions.

AUDELS MATHEMATICS & CALCULATIONS FOR MECHANICS $2

Mathematics for home study or reference. 700 pages, 550 illus. Practical mathematics from beginning. How to figure correctly. Easy, correct methods covering a complete review. Ill. & Indexed.

AUDELS HANDY BOOK OF PRACTICAL ELECTRICITY $4

For maintenance engineers, electricians & all electrical workers. 1440 Pages, 2600 Illus. Covers important electrical information in handy form—including Marine Wiring, Radio Principles, Welding. Indexed. A key to a practical understanding of electricity.

AUDELS RADIOMANS GUIDE.....$4

A key to the practical understanding of radio including Frequency Modulation, Television, etc., Aircraft & Marine Radio. For radio engineers, servicemen, amateurs. 772 pages. 400 Illustrations & Diagrams. Photos. Review Questions & Answers, Reference Index. Authentic, clear, concise.

AUDELS ELECTRONIC DEVICES....$2

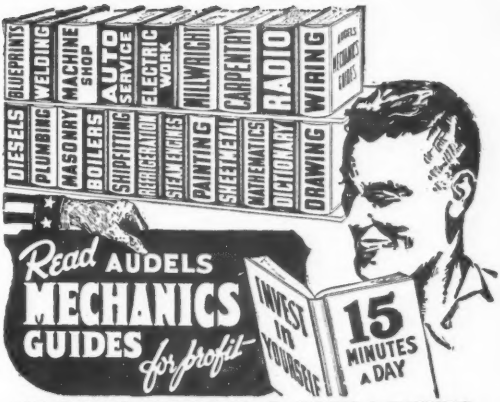
Tells What You Want to Know About Electric Eye. Easily Understood. Covers photo-electric cells & their applications. Amplifiers, illumination, frequencies, voltage, photocell, tubes, Ohm's Law, wiring diagrams, etc.

AUDELS WELDERS GUIDE.....$1

A concise, practical text on operation & maintenance of all welding machines for all mechanics. Over 400 pages, illustrated. Covers all methods of electric and acetylene welding including airplane work.

AUDEL, Publishers, 49 W. 23 St., N. Y. 10

PRINTED IN U.S.A.



AN AUDEL GUIDE IS A GOOD FRIEND!

Use the brains and experience of others in these Guides of the Trades. Save time and money with right methods, short cuts, labor saving ideas. CHECK NOW! You can look over any Audel Guide in your home. Start the Easy Payments if satisfied.

CUT HERE

MAIL ORDER

THEO. AUDEL & CO., 49 W. 23 St., New York 10, N.Y.

Please mail me for 7 days' free examination the books marked (X) below. I agree to mail $1 in 7 days on each book or set ordered, and to further mail $1 a month on each book or set ordered until I have paid purchase price.

If I am not satisfied with Guides I will return them.

- ☐ Audels OIL BURNER GUIDE . . . . . $1.
- ☐ Audels REFRIGERATION & Air Conditioning Guide. 4.
- ☐ Audels POWER PLANT ENGINEERS GUIDE . . . 4.
- ☐ Audels PUMPS, HYDRAULICS & AIR COMPRESSORS 4.
- ☐ Audels WELDERS GUIDE . . . . . 1.
- ☐ Audels BLUE PRINT READING . . . . . 2.
- ☐ Audels SHEET METAL WORKERS Handy Book . . 1.
- ☐ Audels SHEET METAL PATTERN LAYOUTS . . . 4.
- ☐ Audels AIRCRAFT WORKER . . . . . 1.
- ☐ Audels MATHEMATICS and CALCULATIONS . . . 2.
- ☐ Audels MACHINISTS & TOOLMAKERS Handy Book 4.
- ☐ Audels MECHANICAL Dictionary . . . . . 4.
- ☐ Audels AUTOMOBILE GUIDE . . . . . 4.
- ☐ Audels DIESEL ENGINE MANUAL . . . . . 2.
- ☐ Audels MARINE ENGINEERS Handy Book . . . 4.
- ☐ Audels SHIPFITTERS Handy Book . . . . . 1.
- ☐ Gueths MECHANICAL DRAWING COURSE . . . 1.
- ☐ Rogers DRAWING and DESIGN . . . . . 2.
- ☐ Audels MILLWRIGHTS and Mechanics Guide . . . 4.
- ☐ Audels CARPENTERS and Builders Guides (4 vols.) . 6.
- ☐ Audels PLUMBERS and Steamfitters Guides (4 vols.) 6.
- ☐ Audels MASONS and Builders Guides (4 vols.) . 6.
- ☐ Master PAINTER and DECORATOR . . . . . 2.
- ☐ Audels GARDENERS & GROWERS GUIDES (4 vols.) 6.
- ☐ Audels ENGINEERS & FIREMANS EXAMINATIONS 1.
- ☐ Audels ENGINEERS and Mechanics Guides Nos. 1, 2, 3, 4, 5, 6, 7 and 8 complete . . . . . 12.
- ☐ Audels Answers on Practical ENGINEERING . . . 1.
- ☐ Audels ELECTRICIANS EXAMINATIONS . . . . 1.
- ☐ Audels WIRING DIAGRAMS . . . . . 1.
- ☐ Audels Handy Book of PRACTICAL ELECTRICITY . 4.
- ☐ Audels ELECTRICAL POWER CALCULATIONS . . 2.
- ☐ Audels ELECTRONIC DEVICES . . . . . 2.
- ☐ Audels ELECTRIC Dictionary . . . . . 2.
- ☐ Audels RADIOMANS GUIDE . . . . . 4.
- ☐ Audels NEW ELECTRIC LIBRARY at $1.50 a Volume Vols. I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII

*Name*_____

*Address*_____

*Occupation*_____

*Employed by*_____ MM

NEW "EVEREADY" FLASHLIGHT BATTERY LASTS 93% LONGER!

What? Horsepower in a Flashlight Cell?

Yes! Here's one horsepower, dramatized in picture form — 33,000 foot-pounds of energy! Yet a 3-cell flashlight, equipped with new "Eveready" flashlight batteries, contains only 1% less than a *full horsepower!* Think of it in terms of work done by a husky 1-horse motor . . . think of it working for *you* in your flashlight, producing brilliant, enduring light!

FLASHLIGHT USERS! Look what science has done to give you better light: Great new "Eveready" flashlight batteries *now* produce 93% more energy! Nearly *double* the power output of even pre-war "Eveready" cells, long the world's standard for brilliant light, long life, and uniformity. Now you get dazzling bright light for almost twice as long! Ask for new "Eveready" flashlight batteries —they've got *POWER!*

The registered trade-mark "Eveready" distinguishes products of

NATIONAL CARBON COMPANY, INC.

30 East 42nd Street, New York 17, N. Y.

Unit of Union Carbide UCC *and Carbon Corporation*

Nearly *twice* the electric energy . . . almost *two times longer life* of brilliant white light than even famous pre-war "Eveready" flashlight batteries. *That's* today's *high-energy* "Eveready" battery, as proved by the "Light Industrial Flashlight" test devised by the American Standards Association.

93% MORE ENERGY